JPRS-UST-86-024

9 OCTOBER 1986

USSR Report

SCIENCE AND TECHNOLOGY POLICY

FBIS FOREIGN BROADCAST INFORMATION SERVICE

NOTE

JPRS publications contain information primarily from foreign newspapers, periodicals and books, but also from news agency transmissions and broadcasts. Materials from foreign-language sources are translated; those from English-language sources are transcribed or reprinted, with the original phrasing and other characteristics retained.

Headlines, editorial reports, and material enclosed in brackets [] are supplied by JPRS. Processing indicators such as [Text] or [Excerpt] in the first line of each item, or following the last line of a brief, indicate how the original information was processed. Where no processing indicator is given, the information was summarized or extracted.

Unfamiliar names rendered phonetically or transliterated are enclosed in parentheses. Words or names preceded by a question mark and enclosed in parentheses were not clear in the original but have been supplied as appropriate in context. Other unattributed parenthetical notes within the body of an item originate with the source. Times within items are as given by source.

The contents of this publication in no way represent the policies, views or attitudes of the U.S. Government.

PROCUREMENT OF PUBLICATIONS

JPRS publications may be ordered from the National Technical Information Service (NTIS), Springfield, Virginia 22161. In ordering, it is recommended that the JPRS number, title, date and author, if applicable, of publication be cited.

Current JPRS publications are announced in Government Reports Announcements issued semimonthly by the NTIS, and are listed in the Monthly Catalog of U.S. Government Publications issued by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Correspondence pertaining to matters other than procurement may be addressed to Joint Publications Research Service, 1000 North Glebe Road, Arlington, Virginia 22201.

JPRS-UST-86-024
9 OCTOBER 1986

USSR REPORT
SCIENCE AND TECHNOLOGY POLICY

CONTENTS

ORGANIZATION, PLANNING AND COORDINATION

Greater Economic Return From Sectorial Science Needed
(M. Bashin; SOVETSKAYA ROSSIYA, 21 Mar 86)..... 1

FACILITIES AND MANPOWER

Institute for Automation of Petroleum, Chemical Industry
(BAKINSKIY RABOCHIY, 24 Apr 86)..... 5

PATENTS AND INVENTIONS

Negative Luminescence, Development of Semiconductors
(T. Larina; SOTSIALISTICHESKAYA INDUSTRIYA,
20 Apr 86)..... 10

Addition of Coauthors Increases Rewards to Inventors
(G. Chernikov; LITERATURNAYA GAZETA, 14 Mar 86)..... 12

Device for Steeple Jack Work Needs Ministerial Support
(G. Kiksman; TRUD, 27 Mar 86)..... 14

Spray Guniting of Converters in Ferrous Metallurgy Delayed
(Vladimir Popov; PRAVDA, 4 Apr 86)..... 17

Payment for Development of Invention, Not Introduction Urged
(R. Englin; SOVETSKAYA ROSSIYA, 18 Apr 86)..... 21

Storage of Produce in Controlled Gaseous Atmosphere Delayed
(A. Batygin; PRAVDA, 21 Mar 86)..... 24

Invention, Patent Work at Tajik Academy of Sciences
(P. Solozhenkin; KOMMUNIST TADZHIKISTANA, 7 May 86)..... 29

INDUSTRIAL AND COMMERCIAL APPLICATION

Use of Magnetohydrodynamics in Metallurgy
(V. Khrustov; IZVESTIYA, 9 Apr 86)..... 33

REGIONAL ISSUES

Development of VUZ Science of Rostov Oblast
(Valentin Yefimovich Shushkinov; EKONOMICHESKAYA GAZETA, No 16, Apr 86)..... 36

Preplanning Study of Problems of Progress, Productive Forces
(Yu. Blokhin; SOVETSKAYA MOLDAVIYA, 15 Apr 86)..... 40

Increase of Return From Kirghiz Academic Institutes
(V. Zhivoglyadov; SOVETSKAYA KIRGIZIYA, 13 Mar 86)..... 44

CONFERENCES AND EXPOSITIONS

International Symposium on Mental Health
(V. Likholitov, I. Neklyudov; MEDITSINSKAYA GAZETA, 21 May 86)..... 48

Annual General Assembly of Georgian SSR Academy of Sciences
(ZARYA VOSTOKA, 4 May 86)..... 52

GENERAL

Role of Basic Science in Scientific, Technical Progress
(S. Matinyan; KOMMUNIST, 6 Apr 86)..... 57

Achievements of Science of Union Republics Detailed
(NTR: PROBLEMY I RESHENIYA, No 4, 18 Feb-3 Mar 86)..... 62

Evaluation of Social Utility of Scientific Labor
(Merab Gvelesiani; ZARYA VOSTOKA, 6 Apr 86)..... 73

/9835

ORGANIZATION, PLANNING AND COORDINATION

GREATER ECONOMIC RETURN FROM SECTORIAL SCIENCE NEEDED

Moscow SOVETSKAYA ROSSIYA in Russian 21 Mar 86 p 1

[Article by M. Bashin, member of the Scientific Council of the USSR Academy of Sciences for the Economics of Scientific and Technical Progress, under the rubric "The Opinion of a Specialist": "Sectorial Sciences: Increase the Return"]

[Text] At the editorial office of SOVETSKAYA ROSSIYA they acquainted me with the letter of young miners from Prokopevsk. "Our labor is 90 percent manual: an axe, a shovel, a sledge hammer...yet it is not the difficulty of the labor that forces us to sit down at the letter, but the feeling of its meaninglessness. In a month our sections mine as much coal as a mechanized longwall mines in a day or two. What sense do our fatigue and our work then make? At the meetings on new equipment no one even utters a word, they prefer to speak about the tightening up of discipline and the search for internal reserves. But in the USSR Ministry of the Coal Industry several institutes are engaged in the development of mining equipment. Why should we offset with our muscle power their negligence?"

It is a proper question. This letter is characteristic for the fact that it reflects the overall situation which has formed in sectorial science. It does not bear responsibility for affairs at the works and for the lag of its technical base. For example, does the same Kuznetsk Scientific Research Institute of the Coal Industry, which for many, many years has not developed a good machine for the extraction of coal from steep seams, really feel shame that across the road from it the miners are toiling with a sledge hammer, while it is time to turn the mines themselves into museums of mining? Hardly. For there is complete order, as they say, at the institute both with bonuses and with the plan.

At the 27th party congress serious complaints were justly lodged against sectorial science. The largest detachment of scientists works here, 80 percent of all the resources being allocated for the development of science and technology are received here. It would seem that the return should also increase in proportion to the investments. But the statistics attest to a different thing. From 1976 to 1984 the profit per ruble of expenditures decreased from 39 to 33 kopecks, while the number of relatively freed workers per 1 million rubles of expenditures decreased from 80 to 42. The basic cause

of the negative trends is the orientation of sectorial science not toward the development of fundamentally new technology, but toward minor improvements of already assimilated equipment.

Modern production cannot live without updating. And the means for this exist--the constant introduction of the most advanced technology and the retooling of enterprises. The times urgently require the gap between the basic elaboration of the technical problem and its embodiment in production to be decreased.

It is well known that a major and promising scientific idea originates, as a rule, in large-scale science. The academic institute (or science of the higher educational institution)-the sectorial scientific research institute-the enterprise--here is the bridge with a large capacity, via which the achievements of sciences quickly yield an impact in the national economy. But the analysis showed that in recent years only 5-6 percent of the work of sectorial scientific organizations was based on major achievements of academic science. Moreover, cases, when the introduction of new equipment is hindered precisely through the fault of sectors, are being encountered more and more often. Many factors, even arrogance, jealousy of others' success...work against it. Here is a typical example. The introduction of a new and very promising method of machining metal in accordance with the "rolling-drawing" technology, which was developed by scientists of Chelyabinsk Polytechnical Institute, was delayed for a long time as a result of the irresponsible attitude of managers and officials of the USSR Ministry of Ferrous Metallurgy, the USSR Ministry of Heavy and Transport Machine Building, and the institutes subordinate to them. The intervention of state organs was needed in order to finally make way for the technology.

Let us begin with the fact that all the responsibility for sectorial science is assigned to ministries. We, when speaking about the inefficient activity of one institute or another, at times forget this. But much depends on who poses the tasks for scientific research institutes and how he formulates them. Whether it is the institute itself or the ministry. Take the Academy of Sciences. There every institute reports back annually on the work done to the Bureau of the USSR Academy of Sciences. But what about sectorial institutes? For years no one checks their work.

Practical experience convinces us that many staffs of the sector have belittled the role of science, do not set for it long-range goals, and establish scientific research institutes which have neither a material base nor highly skilled personnel. Our institutes turn into an appendage of the staff of ministries, which put out documents, or bring into the world "design freaks." For example, the electrolyzers, which were produced by the All-Union Institute of Aluminum and Magnesium, due to design errors operate with a great overconsumption of electric power. The operational development of these devices requires additional millions of rubles. At the Machine Tool Building Plant imeni Ilich 50 machine tools, which were developed by the All-Union Scientific Research Institute of the Bearing Industry and the Special Design Bureau of Grinding Equipment, were produced. The machine tools proved to be unsuitable for the machining of bearing races. The losses through the fault of designers of the sector came to 1.2 million rubles....

The following fact struck me: in recent years 150 scientific research institutes were shut as superfluous (it is better to say, as fruitless). What are we to do with institutes that are failures? Close them further as well? Recently in an interview, which was arranged by the editorial board in this regard, Deputy Chairman of the State Committee for Science and Technology V.M. Kudinov expressed himself as follows:

"It is hardly worth taking the path of closing 'old' institutes, at which, as a rule, very skilled scientists are concentrated. We see the fruitlessness of a number of such institutes in another thing. First of all in poor scientific supervision and the lack of proper control on the part of ministries. The task most likely must be seen not in closing some scientific research institute but in how to increase the efficiency of its work. It is necessary to increase the level of scientific supervision, it is necessary more boldly--and here I raise both hand 'for'--to change the structure of the institutes themselves and to close resolutely the unpromising laboratories."

I support such an opinion. Rapid scientific and technical progress requires the development of new directions in science and technology and, consequently, the establishment of new scientific collectives. With the same inevitability it relegates to the background or entirely abolishes obsolete directions, which at one time were considered promising. And just do not lag here, do not remain a prisoner of what is customary and run of the mill. Apparently, during the reorganization it is necessary to look at the conformity of not only ministers, but also directors of scientific research institutes to the position. There are many examples of when the replacement of an incompetent manager, radical reorganization, and a bold "changeover" to a new theme have gotten backward institutes out of a hitch.

At the party congress much was said about the means of increasing the efficiency of sectorial science. One of them is the convergence of science and production. It is well known that in Japan and the United States more than half of all the scientists are employed in production. We have intolerably few candidates of sciences and doctors directly in the production sphere. A cardinal reform is necessary here. The party sees it first of all in the transfer of scientific research institutes to production and scientific production associations. However, this process, it was noted at the congress, is proceeding sluggishly, many ministries and departments are openly opposing such convergence. The reasons are that the present situation suits both scientific research institutes, as they do not bear responsibility for the output of obsolete products, and enterprises, as it is easier for them to live, without worrying about the updating of series-produced equipment.

But it is time for everyone--from the minister to the developer--to understand a simple truth: it is possible to develop and introduce advanced equipment, which is not inferior to the best foreign examples, if sectorial science will take a direct part at all the stages of the development of a novelty and will bear the full measure of responsibility for its output. The concentration of the efforts of scientists, designers, process engineers, and, of course, production workers is necessary. That is how the matter has been organized at the Kriogenmash and Svetlana Scientific Production Associations....

The experience, which has been gained in the Ministry of the Electrical Equipment Industry and the Ministry of Instrument Making, Automation Equipment, and Control Systems, suggests another means of increasing the efficiency of scientific research institutes and design bureaus--their changeover to full cost accounting. It is a question of the fact at all research and development would be conducted on the basis of direct orders of industry and by means of the profit from the successful completion of the work sectorial science would form for itself material stimulation funds. Given such a system fruitless scientific research institutes will fade by themselves, there will be no demand for them.... In order to shield institutes from work on minor themes and parallelism, ministries need to achieve the active participation of sectorial science in the fulfillment of the key comprehensive programs and to make the main scientific research institutes responsible for the formulation of the goal programs of the departments.

The main goal of sectorial science is the broad scale of the introduction of advanced technology, at the basis of which are major inventions. It is important that the scientific and technical staffs of ministries and their party organs would take an active position which is aimed at sweeping away everything that hinders the invigorating union of science and production. Let us recall the words from the Policy Report of the CPSU Central Committee to the part congress concerning the fact that it is necessary to find levers "...which will secure priorities only for those research institutions and industrial enterprises, the collectives of which are actively introducing everything new and advanced and are seeking means of the production of high-quality and efficient items." This is the only path to the achievement of the lofty goals. There is no other.

7807
CSO: 1814/218

FACILITIES AND MANPOWER

INSTITUTE FOR AUTOMATION OF PETROLEUM, CHEMICAL INDUSTRY

Baku BAKINSKIY RABOCHIY in Russian 24 Apr 86 p 2

[Article: "In the Azerbaijan CP Central Committee"; first paragraph is BAKINSKIY RABOCHIY introduction]

[Text] The Azerbaijan CP Central Committee discussed the question of the work of the Scientific Research and Planning Institute for the Complete Automation of the Petroleum and Chemical Industry (NIPIneftekhimavtomat) on the increase of the efficiency of scientific research and the introduction of its results in production in light of the decisions of the 27th CPSU Congress.

In the adopted decree it is noted that the NIPIneftekhimavtomat has done some work on the development of means and systems of the monitoring and control of production for the petroleum, petroleum refining, chemical, and petrochemical industry, land reclamation, and geophysics. Automated control systems of the technological processes of petroleum and gas production on land and at sea, the stabilization of the position of floating semisubmersible drilling digs, the optimum water distribution in irrigation, and others have been developed and introduced on the basis of microprocessor equipment.

At the same time the work being performed by the economic management and party organization of the institute does not yet satisfy the demands of the party on questions of the acceleration of scientific and technical progress in the national economy. Many scientific and design developments in their efficiency lag behind the world level and are being carried out incompletely, their results are being introduced slowly in production.

Substantial oversights and shortcomings exist in the style and methods of the organization of scientific activity. The forces of scientists and specialists are being diverted from the elaboration of key problems for the fulfillment of a considerable number of minor themes, many developments do not contain a thorough scientific analysis and specific recommendations and are distinguished by a stereotypic nature.

The NIPIneftekhimavtomat is not pursuing a unified technical policy in the automation of the oil and gas drilling industry and in its complete supply with the latest remote control systems and their elements and is slowly reorganizing its work on the giving of effective assistance to instrument

making plants of the republic in the increase of the technical level and quality of the output being produced.

Individual types of products, which were developed by the institute, have been produced for 10-20 years without changes and modernization, have become obsolete, and do not satisfy the present requirements, while many new systems are not being perfected with respect to design and brought up to a high technological feasibility of production. During the past 5-year period of the 9 developed remote control complexes only 1 was turned over for series production, while of the 20 different elements of automatic equipment only 4 were. Products for export are not being produced in accordance with any development of the institute, only one type has been certified as being of the highest quality category.

During the 11th Five-Year Plan the conditional economic impact of developments per ruble of expenditures decreased from 2.5 to 1.8 rubles. The institute has so far not been changed over to cost accounting. The prevailing system of material stimulation in practice reduces to naught the interest of staff members in the achievement of the greatest efficiency of developments, the bonuses being paid have essentially become a direct wage increment.

In recent years the quality of research has deteriorated. The results of research, which have been obtained by other scientific research organizations, are being inadequately studied and generalized, an invention was patented for the last time 12 years ago. The average duration of developments is increasing, with respect to some of them unjustified dragging out, at time up to 7 years, is being permitted.

The pilot works of the institute is poorly developed. Given the existence at the institute of a modern pool of computers the work on computer-aided design has undergone inadequate development.

The management of the institute is committing serious oversights in the planning of work, the lack of smoothness and the nonuniformity of the workload of individual subdivisions and staff members exist, the proper tension has not been created in their work, in many subdivisions of the institute the spirit of complacency reigns, inertia prevails, the certification of workers is carried out formally, demandingness when evaluating the quality of their labor is missing, publicity is lacking. The work on the placement and training of personnel and the development of realistic criticism and self-criticism requires significant improvement.

Having become the main organization of the newly established Neftegazavtomat Scientific Production Association, the collective of the institute, its economic management, and party organization are slowly reorganizing the work of the sciertific production association in the spirit of the demands of the 27th CPSU Congress. A sharp turn toward the complete and efficient use of the created scientific and technical potential has not occurred, the available reserves and possibilities for the increase of the pace of production and the improvement of the quality of the instruments, systems, and means of control and monitoring, which are being produced, have not yet been put to used.

The party organization of the institute is poorly exercising the right to monitor the activity of the administration, is inadequately cultivating among the communists and all workers a self-critical attitude toward what has been achieved, is inadequately developing creative initiative and activity, and is inadequately increasing the responsibility for the quality and efficiency of scientific research and the speeding up of the introduction of its results in production. In recent years too few reports of the managers of the institute and its subdivisions on the fulfillment of official and statutory duties have been heard at the meetings of the party buro and at party conferences.

The Sumgait City Party Committee is not looking deep into the work of the institute, is not showing the proper demandingness toward managers and the party organization, and is giving them inadequate practical assistance in the improvement of organizing and party political work and in the mobilization of the efforts of the collective for the increase of the efficiency and quality of scientific research and the speeding up of the introduction of developments in production.

The Azerbaijan CP Central Committee resolved to regard as unsatisfactory the work of the economic management and party organization of the NIPIneftekhimavtomat on the mobilization of the efforts of the communists and collective of the institute for the increase of the efficiency and quality of scientific research and the speeding up of the introduction of scientific and technical achievements in production.

It was demanded of the managers of the NIPIneftekhimavtomat (Comrades A. Abdullayev and F. Khalilov) to eliminate the shortcomings which were noted in this decree. In light of the demands of the 27th CPSU Congress to outline and implement specific steps, which are aimed at the sharp increase of the quality of scientific and design developments and the speeding up of the changeover to the production of new generations of systems and means of automation, which are capable of ensuring the introduction of advanced technology in petroleum and gas production and refining, the transportation and storage of petroleum and gas, having directed special attention in so doing to the development of advanced automated system of the control of technological processes and works for the regions of Western Siberia, the Far North, and the continental shelf, as well as for the Caspian Sea Oil and Gas Production Association and the Azerbaijan Petroleum Association.

To create in the collective a creative and at the same time a highly demanding atmosphere, which promotes in every possible way the solution of engineering, scientific, and technical problems. To increase the efficiency and to shorten the time of the performance of research and development. To introduce in every possible way advanced forms of the labor of scientists, to set up automated workplaces, to use as much as possible standard technical solutions. To increase the amount of computer-aided design by not less than fivefold.

During the 12th Five-Year Plan to solve the main problem--to ensure the complete delivery of plant technical management automation systems to objects of petroleum and gas production, to organize their service and repair. To tighten up the author's supervision of the output of products of his own developments. In technical policy to proceed from the need for the assurance

of a high degree of standardization, the operating reliability, durability, convenience, and simplicity of the service and repair of means of monitoring and control.

To carry out during 1987-1989 the construction and expansion of the pilot experimental base of the institute.

Jointly with the enterprises, which belong to the scientific production association, it is necessary to ensure the radical increase of the technical level, the quality of production, and the competitive ability of the products of instrument making enterprises of the republic by the extensive use of microprocessor equipment and integrated technology, to improve substantially the technological feasibility of the items being developed, and to increase significantly the amount of products which have been certified as being of the highest quality category. To take effective steps on the timely introduction of new capacities and the maximum utilization of the available capacities of the plants of the association. To take the necessary steps on the sharp increase during the 12th Five-Year Plan of the volumes of production by the enterprises of the Neftegazavtomat Association.

The party buro of the institute needs to improve the organizing and political work in the collective, having aimed it at the acceleration of scientific and technical progress and the most complete use of the intensive factors of designing and engineering. To regard as the most important task the assurance of the unconditional fulfillment of the assignments which follow from the decree of the CPSU Central Committee and the USSR Council of Ministers "On Measures on the Radical Increase of the Technical Level and Quality of Machine Building Products and the Development of Machine Building as the Basis of Scientific and Technical Progress During the 12th Five-Year Plan and in the Future to 2000."

To increase the responsibility of communists for the solution of the scientific and technical problems which have been assigned to the collective of the institute, to develop in every possible way the initiative of the workers with respect to the development of new highly reliable instruments, automation equipment, and control systems, to launch effective socialist competition for the increase of the efficiency of the activity of the entire association and for the output of instrument products of excellent quality, to show constant concern for the advancement of scientists who are capable at the level of the present scientific and technical requirements of developing the necessary instruments and equipment for the oil and gas drilling industry. To tighten up party monitoring of the activity of of the administration of the institute.

It was decided to ask the Ministry of Instrument Making, Automation Equipment, and Control Systems (Comrade M.S. Shkabardnya) to implement a set of measures on the increase of the efficiency of the work of the established Neftegazavtomat Scientific Production Association. To expedite the settlement of the question of specifying a stable range of products, which are produced by the Ali-Bayramly Plant of Household Appliances, its specialization, the maximum utilization of the production capacities placed into operation, and the supply of the association with highly productive modern equipment, means

of mechanization, automation, and robotization, as well as the accomplishment of the outlined program of the social development of the association.

The Baku, Sumgait, Kirovabad, and Ali-Bayramly City Party Committees in light of the new tasks need to increase the attention to the work of instrument making enterprises, to increase the militancy of the primary party organizations, to aim their activity constantly at the active search for and use of production reserves and the achievement of a high efficiency and quality of work, to strive for the unconditional fulfillment by each labor collective of the assignments on the complete mechanization and automation of production and the introduction of new equipment and technology, to promote the acceleration of scientific and technical progress, and to increase in every possible way the responsibility of personnel.

7807
CSO: 1814/218

NEGATIVE LUMINESCENCE, DEVELOPMENT OF SEMICONDUCTORS

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 20 Apr 86 p 4

[Article by T. Larina: "What Can Invisible Beings Do?"]

[Text] "I did my first experiment on a piece of white woolen material. It was so strange to see how this white soft material gradually melted, like a steam jet, and then completely disappeared! I could not believe that I had done this."

The triumphant joy of Griffin, the hero of Welles' "The Invisible Man," has probably remained in the readers' memory. Now, nearly a century after the publication of the novel, we smile condescendingly when rereading it--it is interesting, but naive, impracticable. But how many times we have already been convinced--modern science and technology are turning the fantastic arabesques of writers of the past into real pictures. Aviation, radio communications, television, flights to other planets--you will not name everything. But the tale of Fortunatus's cap remained a dream.

So it also seemed to me, until I had occasion to visit the Institute of Semiconductors of the Ukrainian SSR Academy of Sciences. The rectangular plate, which stood out clearly against the black background, suddenly disappeared. The effective demonstration illustrated an unknown phenomenon of nature, which was discovered by Soviet scientists--negative luminescence.

The aurora borealis, the flashing of punks and fireflies, the image on a television screen--the nature of different types of luminescence is the same. It arises when a crystal, a liquid, or a gas is exposed to an electric field, penetrating radiation, and light--in short, additional energy is imparted in some way. The mass "migration" of electrons from energetically lower to higher orbits begins. This state is very unstable, and as soon as the influx of energy from outside ceases, the "deserters" go back, losing on the way the excess energy. It is given off as photons.

Until quite recently it was believed that energy "injections" always increase the strength of such radiation: after them the "desertions" occur more often and, hence, more quanta are given off. However, this traditional notion of the nature of luminescence proved to be not entire precise. Experiments showed that under certain conditions the luminescence of crystals in the

infrared band of the spectrum does not strengthen, but weakens and even ceases altogether. This happens, for example, when electron-emitters run away from a semiconductor to electric contacts. A section without electric charges forms wherever "deserters" have just thronged. It does not radiate at all--even in the infrared, thermal region of the spectrum. The crystal, which had just shined in the dark laboratory like a bright star, suddenly disappears, as if covered by a Fortunatus's cap.

"Owing to the nearly complete absence of electromagnetic rays such semiconductors acquire unusual properties which can be used for the development of a new class of instruments," says Professor V. Malyutenko, supervisor of the work and chief of the Department of Plasma Phenomena in Semiconductors. "Negative luminescence is affording extensive opportunities for the study of the most diverse processes and phenomena. At our institute the most important peculiarities of this phenomenon have been studied experimentally and have been described in detail and a theory, which reveals its nature, has been developed."

Until recently only crystals, which had been cooled to the temperature of liquid nitrogen, to nearly -200 degrees Celsius, were able to transmit information in the infrared band. In contrast to them the invisible semiconductors work perfectly well at room temperature. Enormous cryogenic devices are not needed--this significantly simplifies use. Stable sources of infrared radiation and sensors for the measurement of temperature, pressure, and magnetic fields are already operating on the basis of the phenomenon of negative luminescence--in speed and sensitivity they greatly surpass their predecessors.

7807
CSO: 1814/219

ADDITION OF COAUTHORS INCREASES REWARDS TO INVENTORS

Moscow LITERATURNAYA GAZETA in Russian 14 Mar 86 p 1

[Article by Candidate of Technical Sciences G. Chernikov: "Four Together Are More Expensive"; first three paragraphs are LITERATURNAYA GAZETA introduction; capitalized passages published in boldface]

[Text] LITERATURNAYA GAZETA has more than once spoken on the theme of invention. And it is again necessary to speak about the unsolved problems.

In 4 years of the five-year plan 96,000 inventions have been implemented in the country, the economic impact from the use of them and efficiency proposals is approaching 30 billion rubles. The figures are large, but they should not cast a spell: NO MORE THAN A THIRD of the inventions developed annually are introduced.

What is hindering the better, more complete use of the initiative of the innovators of equipment? The letter of our reader concerns this.

An inventor's certificate, which certifies this pleasant fact and an incentive reward—up to 200 rubles--is due to the lucky inventor. But at the cashier's office they will issue him a maximum of 50 rubles and courteously explain: "It is impossible to give one person more—such are 'The Instructions on the Payment of the Reward....' Now if there were four of you, authors, then it is a different matter, then it is possible. Let each one (for the same innovation!) receive his 50 rubles, while in all it will come out precisely 200."

If you add to your application another three coauthors, "The Instructions" advise with a nearly open text, you will do people a kind thing, while what is yours will never leave you.

Look, another inventor (and these, by definition, are quite intelligent people) writes down as his coauthors friends or simply necessary people--why waste money? A favor for a favor—and another time someone will record him in his "collective." As they say: you for me, I for you.

Thus, inventors are the only category of workers, who are rewarded not for the quantity and quality of what has been done, but for...the number of

participants in the labor process. It is possible to imagine what disorder would arise, if this method were also used in other areas. For example, in construction for a cubic meter of brick laying they would pay, say, 10 rubles, if one mason performed the work, and already 40 rubles in case of four! Most likely, our mason would immediately add to his detail another three, and, although he performed the work himself, the total "wage" would come for a cubic meter of laying to 40 rubles, which the "coperformers" would find a means to divide. Here you do not want to, but you will be cunning. Fortunately, among masons and in other areas of our life on this level everything is in order. It is not what exists on the front lines of technical progress--among inventors.

It is clear that such an unusual method of the "stimulation" of inventing activity encourages all kinds of narrow-mindedness. The number of "innovators" (and along with this the unproductive expenditures--for incentive rewards and other benefits, which are due to inventors) increases. Perhaps, such "vyvodilovka" improves the indicators of the work of inventing departments, but does the state need ostentation?

The moral climate of the inventing environment is also deteriorating due to the appearance of the problem of imaginary "coauthorship." In writing down extra people in the application, a person is guided not by practical considerations, but frequently by self-interest, the aspiration to receive a promotion, and so on. Thereby he willingly or unwillingly embarks on the path of undermining moral principles. Is our society really interested in this?

As we see, the conditions have been created for the penetration of very negative, abnormal phenomena into the process of inventing. Is this in keeping with the spirit of the times?

7807
CSO: 1814/215

DEVICE FOR STEEPLE JACK WORK NEEDS MINISTERIAL SUPPORT

Moscow TRUD in Russian 27 Mar 86 p 2

[Article by G. Kiksman under the rubric "The Inventor and the Five-Year Plan" (Moscow Oblast): "A Step Vertically"; first paragraph is TRUD introduction]

[Text] They selected the site for the tests in the Donbass, at the headwork of a mine which had served its time. A thin line hung from the height of a 20-story building. Yu. Sukhodrovskiy, the inventor from the Moscow area, should have climbed up it. The very idea of such an ascent seemed fantastic to many of the engineers who were present....

In recent years apartment and public buildings and industrial structures have risen rapidly and continue to range upward. Their construction, the installation of units, and repair have become complicated. The rigging has remained traditional. Many people and much time are required for the assembly of the scaffolding. It is impossible to perform many operations single-handed and in the unwieldy cages which are raised by means of an electric motor. While within narrow smokestacks, wells, and boilers and at dam sites such cages are entirely unacceptable. The most experienced steeple jacks, of whom, alas, there are not enough, have to be enlisted in the restoration of historical monuments.

Here is why the problem of the small-scale mechanization of steeple jack operations is so urgent.

Engineer Sukhodrovskiy did not have anything to do with this problem. An amateur motorist, he more than once skidded in bad weather on country roads. He acquired a winch—it proved to be unwieldy and inconvenient to operate. He designed his own—a miniature, strong one, with reliable cable grips. And he tested it himself: he chose on the tree a little stronger branch, attached the cable to it and the hook of the winch to the car, sat on the hood, and by the movement of the handle...raised the car together with himself. He did the same thing with an icy line, an oiled line, and a dirty line. The result was the same: the grips hugged the line very firmly.

It was then, 11 years ago, that the idea of using such "catches" for raising a person vertically arose. One grip is in the hands, the second is attached to the feet—pull yourself up by turns, safety is guaranteed. Why are not the steps? But it was necessary to reject this version: the hands are busy, but what work there is without them.

Well, what if there is a grip for each foot? And you keep the body in a vertical position by a pulley which is connected to the line? This was already better. But the legs and neck got tired. It was necessary to exchange one component for another, one assembly for another. The Verkholaz—that is what the device was called--became more and more perfect.

Sukhodrovskiy is wearing a helmet and overalls, with mine rescue gear. He passed the line through a thin steel pipe with two small boxes—the mechanisms of stepping and the keeping of the body in a vertical position. He tightened the belt. And took the first step upward....

"Was it terrifying, Yuriy Vasilyevich?" I asked him later.

"It was terrifying. Among my colleagues, aircraft designers, the test pilots give innovations a start in life. I had to test the Verkholaz myself. Of course, age made itself felt—I am nearly 60. But the point also consisted in this—to demonstrate that such ascents are within the power of any person."

To demonstrate.... The legs scarcely obeyed. It seemed that they had attached a pood weight each to them. His head spun because he was not used to it. He wanted to come back down, to the concrete platform. He forced himself to move farther. He impressed upon himself: everything will be all right, everything has been checked and rechecked, the parts are reliable--I made them myself. Back in childhood he learned to do mechanical work, grind, drill.

Confidence appeared somewhere midway. And together with it the sensation of flying: the sun, the outlines of headworks and buildings, which emerged from afar. He rocked slightly in the wind....

The metal girder, to which the line was attached, is closer and closer. He noted the time: only a little more than 2 minutes were spent on the ascent—nearly one-third as much than if he had taken the stairs. He sat on the gangway and got his breath. And also descended.

They congratulated him and shook his hands. Sukhodrovskiy did not share the common joy. Since half the ascent came with difficulty, the next development is necessary.

"Do you know in what I was mistaken? I sought and found errors in the technical solutions and forgot in so doing the psychological factor. For people are accustomed to feeling firmly and steadily on the ground. But here there is one single thread of the line. And doubt arises: Will it hold out? I introduced an additional safety line and duplicated all the components of the design, on which safety depends. However, I understood: the operating area of the Verkholaz is too limited in space. It was necessary to learn to move it not only vertically, but also horizontally."

He worked after the shifts, in the evenings. On vacation. In a hospital bed. The solution came suddenly--in a dream. He clearly saw every part, every assembly. He was afraid of one thing: he would open his eyes, and everything would disappear. He jumped up, grabbed a pencil, paper....

I watched the operation of the Verkholaz at a construction site. First Sukhodrovskiy easily ascended along the outside surface of the enormous tank, by pulling a cord moved the device along the guide angle section to the right and to the left. Then, after brief instruction the installers repeated his route. They performed the necessary operations. And requested drawings in order to produce the device at their own production base. Incidentally, planning institutes, enterprises, trusts, steeple jacks, speleologists, repairmen of maritime ships...are addressing similar requests to the inventor.

"The possibilities of the Verkholaz are far from exhausted," Sukhodrovskiy believes. "For example, in combination with a portable hoist, which moves along a parallel loading line, a steeple jack can install components weighing up to 1.5 tons. It is now a matter of series production."

There are more than enough official opinions and recommendations concerning the effectiveness of the Verkholaz. It is protected by many inventor's certificates. The approximate cost in case of mass production is in the range of 150 rubles. Meanwhile, as before, only individual organizations are producing the device, for themselves.

It would seem that the USSR State Committee for Construction Affairs should display the greatest interest in the Verkholaz. The visit of its staff members to the Central Scientific Research, Planning, and Experimental Institute of the Organization, Mechanization, and Technical Assistance to Construction reduced, however, to the statement of a fact which is well known as it is: the safety of the work is 100 percent.

So far the main technical administrations of the union Ministry of Industrial Construction, Ministry of Construction, and Ministry of the Construction Materials Industry, the USSR Ministry of Power and Electrification, the USSR Ministry of Installation and Special Construction Work, and the USSR Ministry of Ferrous Metallurgy, the RSFSR Ministry of Housing and Municipal Services...have not displayed proper attention to the invention. Although precisely their subdivisions turn most often to Sukhodrovskiy for drawings.

"Unfortunately, such is the fate of the majority of authors who independently, over many years have to push their works through," Yuriy Vasilyevich says. "Here it turns out that they frequently become obsolete, never having found practical application. The solution? In my opinion, the USSR State Committee for Inventions and Discoveries should not be the only organ which issues inventor's certificates. Why should this committee not select the most effective inventions? It would be possible to recommend them to the USSR State Committee for Science and Technology, the USSR State Planning Committee, for mandatory introduction at enterprises of specific industries."

Is the inventor right? Or is he incorrect? I would like to hear the point of view of the organizations involved in the matter.

7807
CSO: 1814/215

SPRAY GUNITING OF CONVERTERS IN FERROUS METALLURGY DELAYED

Moscow PRAVDA in Russian 4 Apr 86 p 2

[Article by Vladimir Popov, USSR State Prize winner, writer, and honored metallurgist, under the rubric "The Routes of Scientific and Technical Progress" (Moscow): "The Treasures Are Quite Close"; first paragraph is PRAVDA introduction]

[Text] To work in the new way means first of all to take into account the mistakes of the past and to learn from them, as was stated at the party congress, lessons of truth.

Therefore, I believe, it will not be out of place to recall that the most significant inventions have been fated to cover a winding and long path. And most often not technological difficulties, but psychological barriers became the cause of this. Moreover, it is so easy and simple to reject others' ideas. They did not pass judgment and did not punish for this, they only reprimanded.

The use of oxygen, this powerful intensifier of metallurgical processes, which was proposed by engineer A. Mozgov, was delayed for 20 years--authoritative scientists asserted a priori that there would be explosions, breakdowns of units, and unavoidable human victims. But subsequently the author was awarded the USSR State Prize.

For long years experts, who did not understand the essence of the phenomenon, checked the use in industry of the electrohydraulic effect, which creates ultrahigh pressures and which L. Yutkin discovered.

The departmental expert commission also denied the possibility of the use of hydrofoils, citing the tortuosity of the channels of rivers, the density of traffic, floating logs, and a large number of other factors, including economic inadvisability. Subsequently the group of inventors headed by engineer R. Alekseyev was awarded the Lenin Prize.

Experts managed for more than 10 years (it was necessary to be able to!) to check the patenting of one of the most important inventions of the century, which was developed by N. Basov and A. Prokhorov--the laser. Subsequently these scientists were awarded the Lenin and Nobel Prizes. The lessons of

these scandalous events are difficult, but instructive, I wrote about them at one time and recall them again with anguish. However, there are events of a different order. The experts are "for," no one expresses any objections, but years pass from the origin of an idea to its implementation. In essence it is a matter of a gap between word and deed, which was spoken about with alarm at the party congress.

I want to tell about the fate of two inventions. Nearly 2 decades ago the young engineers O. Chemeris and P. Yuzefovskiy under the supervision of the well-known scientist Doctor of Technical Sciences Professor M. Medzhibozhskiy conceived the idea to change the system of the repair of converters, which had formed throughout the world. These large-capacity steelmaking units had to be shut down for the replacement of the refractory lining every month. There had to be spent on this from 3 to 5 days and about 100,000 rubles.

The invention of so-called spray guniting was the result of the thoughts of the scientists, their research, calculations, and experiments. Its essence consists in the following. Refractory and coke powders are fed into the converter in jets of oxygen, which are dispersed in a specific manner. The coke burns up, while the refractory particles at high temperature soften and adhere to the worn-out lining. A coating, which protects the lining against attack by slag, is formed. Everything occurs in 5 minutes. After 100-200 such guniting operations the life of the converter is doubled.

The experiments on guniting were begun at the Combine imeni Ilich in Zhdanov, while they introduced the new process for the first time in Western Siberia in Novokuznetsk. There the record durability of the lining of a converter instead of 600 meltings owing to guniting reached 2,500. After this the USSR Ministry of Ferrous Metallurgy made it incumbent to introduce the new technology in all converter shops. Considerable time was freed for the production of steel, an enormous quantity of forces and assets, particularly expensive refractory brick, was saved! Moreover, the process is completely mechanized. Reconditioning is accomplished by pushing several buttons. Such a degree of the mechanization of refractory operations was achieved for the first time in the world!

Now they are using our method of guniting abroad, the most flattering reports are coming from there: "Spray guniting surpasses all the used methods of reconditioning the lining of converters." So write specialists of the very large Japanese firm Kawasaki.

Thus, a victory! But not without losses. And the main one of them is irreversible—time. Ten years passed from the idea to its introduction. If it were not for the fantastic persistence of the authors, who with the minimum associates designed, produced, operated, and repaired the equipment and studied and improved the technology, their creation would surely not have survived. The human factor, about which they are now speaking in hundreds of ways, played the main role. If the inventors had not been so dedicated and energetic, the state would not have derived a profit of millions of rubles annually and would not have the considerable currency receipts from the sale of licenses.

Perhaps, it would not have been worth stirring up the event, if a similar one had not recurred: the authors are the same, the scene of the action is the same, the same process--spray guniting--is at the basis of the invention, but in the new version it yields a significantly greater impact.

Chemeris and Yuzefovskiy are already well-known scientists, candidates of technical sciences, winners of the USSR State Prize, and senior scientific associates of the All-Union Institute of Refractory Materials. They have to their account more than 20 inventions on guniting, no fewer foreign patents, and more than 100 publications.

The new idea is even simpler than the "old" one, but its introduction promises an annual economic impact no longer of millions, but of tens of millions of rubles. What is this new thing named "the OShP process"? In the above-described "old" process of spray guniting the scientist proposed to replace the refractory powder with lime. Having been applied to the lining, being a refractory coating, the lime protects it against attack by converter slag. In this case it gradually dissolves in the slag and is reused, but now for an immediate purpose--for the improvement of the quality of steel.

OShP is the process of applying refractory slag-forming coatings. The basic merit of the process is that conventional refractory materials are not required for its implementation. If you gunite the lining indefinitely, the durability of converters will increase indefinitely. A "perpetual converter," as the authors express themselves, will be obtained.

Professor M. Medzhibozhskiy believes that guniting with lime has another advantage--it improves the heat balance of the converter process and thereby makes it possible to decrease the consumption of pig iron and, hence, also to decrease the production cost of steel.

Of course, not everything is as simple as I have described, but it is also not difficult. In itself the lime does not adhere to the lining, it is necessary to add several additives to it. But as a whole there are neither scientific nor technical problems.

If metallurgists had gained experience in guniting with lime, they would be convinced that converters can operate without reconditioning for 2,000-3,000 meltings and the need for the construction of a refractory shop, which is now being designed for the converter shop of Magnitka, which is under construction, could have disappeared.

What is hindering its victory march and how is its introduction to be sped up? Professor A. Shershnev, chief of the Laboratory of Spray Guniting of the All-Union Institute of Refractory Materials, answers these questions with convincing certainty:

"Several 'economic' metallurgists, being worried about a rainy tomorrow, fear that the saving of refractory materials even when conducting experiments on lime guniting will give planning organs grounds for the decrease of the rates of consumption of refractory materials in the immediate future. These apprehensions were responsible for the length of the incubation period of

spray guniting and are now hindering the assimilation of the OShP process. Therefore, I consider it necessary to establish under the Technical Administration of the USSR Ministry of Ferrous Metallurgy a permanent commission made up of scientists and representatives of enterprises, to outline specific measures and the deadlines of their implementation, and not only to demand, but also to help the plant workers."

Spray guniting found its feet owing to the coincidence of two forces acting in the same direction: the enthusiasm of the inventors and the assistance of the Ministry of Ferrous Metallurgy. The enthusiasm of the inventors of the OShP process is not exhausted, but it is necessary to increase the assistance to them.

7807
CSO: 1814/215

PAYMENT FOR DEVELOPMENT OF INVENTION, NOT INTRODUCTION URGED

Moscow SOVETSKAYA ROSSIYA in Russian 18 Apr 86 p 3

[Article by Candidate of Technical Sciences R. Englin under the rubric "For Discussion": "What Is Hindering the Kulibins"]

[Text] There are no useless inventions. Any of them is a step in the direction of progress, new information about the processes in the surrounding world. And not only because even the most "unsuccessful" inventions can subsequently serve as a stimulus to a new technical solution and become a prototype for the development of a successful machine, but also because today scientific and technical information has begun to serve as an indicator of national wealth. It is possible to use it within the country, and it is possible to sell it abroad, as gas, lumber, and motor vehicles are sold. The difference, however, is that, in selling information, we do not lose it, which, alas, you would not say about petroleum or tungsten ore.

The following fact testifies to what role the information contained in an invention is assuming today: Japan by 1990 plans primarily to export not items and machines, but new scientific and technical information. The same Japan expressed the desire to purchase a collection of our...rejected applications, being well aware that enormous value lies even in these "rejects" of the inventor's labor.

Here I am approaching the problem. If the main value of an invention is informational, while the development of new information is the main task of the inventor's labor, then it is necessary to pay precisely for this labor, and not to make the reward dependent on whether or not the invention will be introduced. For not every talented inventor is talented in the introduction of inventions. And who knows how many valuable, unique technical solutions did not emerge only due to the fact that inventors spend years and years on the implementation of their ideas. Then how much more profitable it is to use them for the generation of new ones!

But the amount of the author's reward, the status of the author in society, awards, honorary titles--all this depends on whether or not an invention, which was developed by the author and turned over by him to the state for exclusive and permanent use, has been used. Here inventors, having rolled up their sleeves, have to undertake work which is not characteristic of them.

Moreover, the engineer-inventor and the engineer-noninventor, who is equal to him in position, receive the same wage. It turns out that the person, who expends enormous mental and physical labor on the development of an invention, bears a large mental and moral load, and takes many days and nights away from his free time, is equated in the wage with a person who does not perform similar work. Is this just? Such a situation is at variance with the principle "From each according to his abilities, to each according to his labor."

No one disputes that the labor of an inventor is creative and is comparable to the labor of a composer, a poet, and a writer. But why does a different approach to the results of their labor exist?

In the new version of the CPSU Program it is stated that the party attaches particular importance to the stimulation of highly skilled and highly productive work for the good of society. It seems that this principle should also be consistently applied with respect to the inventor's labor. In my opinion, it would be just for each invention (regardless of whether it remains useful information or will be used directly in the national economy) when presenting the inventor's certificate to pay a one-time reward, in much the same way as is done, for example, when issuing the certificate to the author of a discovery.

It is possible to differentiate the payment subject to the coefficients, which take into account the actual value of the invention, its technical level, and the possible technical and economic impact. At present inventions, which do not create a saving, are paid for in accordance with similar coefficients. It is natural that one should no longer pay the authors any additional reward in case of the introduction of the invention. Here the main credit belongs to the "introducers" (including the authors, if they take a direct part in introduction). It is also necessary to pay bonuses to those who carry out introduction regardless of whose invention is being used: "their own" or "others'."

At the same time the importance of moral measures of stimulation should be increased and the corresponding statutes, which envisage government awards, special prizes named after outstanding inventors (Kulibin, Tsiolkovskiy, Cherepanov), and honorary titles, should be drafted.

The changeover to the payment for the development of an invention, and not for its introduction entails a large number of socially useful consequences. The effectiveness of the inventor's labor will increase by many fold, the exhausting search for the enterprises, which have used an invention, but have not gotten around to informing the author of this, will sink into oblivion. Such a disgraceful phenomenon as false coauthorship, which was caused by the fact that the author, be he even Kulibin himself, is now forced to include in the application "influential" and "necessary" people, on whom the use of his idea depends, will disappear from our life. The struggle between "one's own" and "others'" inventions, which is harmful to the national economy, will cease. The expenditures on the pay of the staff, which is engaged in the

calculation of the saving and the centralized payment of the author's reward, will decrease....

Enormous tasks on the cardinal acceleration of scientific and technical progress face our country. It is impossible to accomplish them without inventors. So let the inventor invent!

7807
CSO: 1814/215

STORAGE OF PRODUCE IN CONTROLLED GASEOUS ATMOSPHERE DELAYED

Moscow PRAVDA in Russian 21 Mar 86 p 3

[Article by A. Batygin: "The Winter Apple. The Fate of an Invention"]

[Text] It is not enough to harvest the crop, it is necessary to bring it in time under a roof and to store it. It is here that the question arises: Where is it to be stored, under what conditions? In the Basic Directions of USSR Economic and Social Development for 1986-1990 and the Period to 2000 in the section, in which the tasks of the agroindustrial complex and the implementation of the Food Program are discussed, it is recorded: "To improve the quality of products, to eliminate their losses at all stages of production, transportation, storage, and sale.... To improve the organization of the transportation, processing, and storage of products."

In many respects the accomplishment of these tasks depends on whether science will be able to turn to face the needs of production, and production will be able to turn to face science.

How many first class products are lost, never having gotten to those for whom they were grown! It has been calculated that railroad cars of vegetables and fruits move to the consumer with an average speed of 12-13 kilometers an hour--a wagon of the distant past ran more smartly over country roads. And while, for example, delicate berries are transported at such a snail's pace, they have time to turn into mash.... And here at last the gifts of gardens and fields arrive at the warehouses and storehouses. It turns out that they do not wait very much here for them.

Scientists have developed various methods of storing potatoes, vegetables, and fruits. Among them are forced ventilation and storage in a cooled state with the use of refrigeration and natural cold, storage without access for air and in a dry or frozen state. However, in the opinion of specialists, such methods do not make it possible to solve completely the problem of the long-term storage of products without substantial losses.

In recent years abroad the method of storing products in a so-called controlled gaseous environment (RGS) has become widespread. It consists of three components: oxygen, carbon monoxide, and nitrogen. Nitrogen serves here as a kind of magic wand, forcing the cells to sink into lethargy.

However, the presence in the atmosphere of carbon monoxide, nitrogen oxides, and other products of the combustion of natural gas affects the quality of fruits and vegetables.

A group of scientists of the Moscow Technological Institute of the Food Industry proposed another technological approach: to store products in a controlled gaseous atmosphere, which consists mainly of two components with an increased content of nitrogen. The optimum ratio of oxygen and nitrogen is determined and established in the process of storage so that the products would be kept in a state of minimum physiological activity.

Over several years the innovation underwent laboratory and production tests for various agricultural crops: cereal crops, fodder crops, fruits, vegetables, and so on. The results were reassuring. For example, the losses of potatoes during 7 months of storage in a nitrogen gaseous atmosphere came to only 3 percent, while for the tubers of the control batch, which were stored in an ordinary atmosphere, the losses exceeded 15 percent.

White cabbage was in a nitrogen atmosphere in the laboratory chambers of the food institute for more than 300 days. At the end of August its losses came to 10 percent, while the affection with gray mold rot and slime bacteriosis came to 0.2 percent. At the same time the cabbage, which was stored in the control chamber under ordinary conditions, by May already proved to be completely affected by "sores." At the same time the losses of winter varieties of apples, which were "registered" for 11 months in a nitrogen atmosphere, came to only 1-2 percent. So that during the most inclement season of the year there are no problems--please, a winter apple for the table!...

The conducted research showed that under the conditions of gaseous nitrogen it is possible to successfully store potatoes and fruits which have been damaged during harvesting and transportation. A protective layer is formed on such fruits and tubers, seats of rotting do not develop.

And this is not yet everything. Scientists established the previously unknown dependence of the increase of the yield of agricultural crops, if their seeds have first been stored in gaseous nitrogen.

Any introduction of new equipment and technology, as is known, requires considerable efforts and expenditures. One should not forget the efficiency of innovations. And therefore let us calculate. For the supply of a storehouse with gaseous nitrogen there is used in essence...free material. According to the data of the State Institute of Planning of Oxygen Industry Enterprises, the cryogenic enterprises and air-fractionating plants of the country daily discharge into the atmosphere tens of millions of cubic meters of nitrogen. It is simple to "attach" new storehouses and elevators to cryogenic enterprises. There can also be another version--to renovate the operating storehouses so as to connect them to such sources.

Moreover, the calculations showed: if storehouses with the use of a controlled gaseous atmosphere are built, they will actually cost slightly more

than "classical" ones--with forced ventilation, but the recovery time of the expenditures is shortened by several fold.

"The practical implementation of the new storage technology will make it possible to increase annually the production of agricultural products and to increase their keeping capacity by 20-25 percent as compared with the achieved level," G. Gudkov, chief of the Agriculture, Land Reclamation, and Water Resources Department of the State Committee for Inventions and Discoveries, believes.

The State Committee for Inventions and Discoveries back in 1975 provided information on the highly efficient method of storing products and seeds, which was available in the country. The USSR State Committee for Science and Technology, which was commissioned to organize and head the work on the extensive production checking and introduction of the new technology, at that time adopted the corresponding decree, which Deputy Chairman of the State Committee for Science and Technology L. Yefremov signed, and approved assignments for a number of ministries on the conducting of research and development.

The Scientific and Technical Council of the former USSR Ministry of Agriculture in 1978 approved of the results of the research and recommended to a number of institutes of the All-Union Academy of Agricultural Sciences imeni V.I. Lenin to expand the performance of work.

However, 10 years simply were not enough to decide: Is the new method to be introduced or not to be introduced? Meanwhile imperfect technologies, as before, are being incorporated in the program of the construction and renovation of storehouses.

How many hours we have sat together with Candidate of Sciences Yu. Repnikov, one of the authors of the invention, and have glanced over tens of sheets of official documents, decrees, and orders.

"We have received more than 10 inventor's certificates for the methods of processing and storing products," Yuriy Ivanovich says. "But the matter, as before, is making no headway...."

Of course, the question arises: the new technology seems to have more than enough advantages--what is hindering its introduction?

For example, in the former USSR Ministry of Agriculture in principle they were not opposed to the controlled gaseous atmosphere. However, in the end the response of Deputy Minister B. Runov (now chief of the Department of the Introduction and Promotion of the Achievements of Science and Advanced Know-How of the USSR State Agroindustrial Committee) proved to be evasive: it is necessary to examine and study the question more. And in general it is in the competence of the Ministry of the Fruit and Vegetable Industry....

At one time the All-Union Ministry of the Fruit and Vegetable Industry shouldered the wholesale bases and cold stores, which were intended for the storage of potatoes, vegetables, and fruits, including the capacities equipped

with a controlled gaseous environment. But the attitude toward the innovation, to put it mildly, in the ministry was cool.

"The proposed method...due to unresolved technical issues with regard to the maintenance of the optimum composition of the gaseous atmosphere was not disseminated," Deputy Minister of the Fruit and Vegetable Industry I. Yefremov (now deputy chief of the Department for the Production and Processing of Fruit and Vegetable Products and Potatoes of the USSR State Agroindustrial Committee) informed the editorial board and added, as if passing sentence: "The storage of seeds and potatoes in an atmosphere with an increased nitrogen content has been deemed ineffective by the Interdepartmental Council for Problems of the Storage and Processing of Potatoes, Vegetables, and Fruits of the All-Union Academy of Agricultural Sciences imeni V.I. Lenin." It is a serious argument. But is that the way it is?

For the present there are indeed enough technical difficulties. For example, at the Karacharovskiy Fruit Storehouse in Moscow it was planned to use the waste nitrogen from the neighboring machinery plant. However, the organizations of the former Ministry of the Fruit and Vegetable Industry were not able to achieve a stable nitrogen content in the chambers of the storehouse due to their inadequate sealing. The production of special airtight doors, hatches, air coolers, reliable instruments, and automatic equipment was not organized, there was also a shortage of skilled personnel for the maintenance of the controlled gaseous atmosphere plants.

But, it seems, it is simply impossible to give up the innovation for this reason. Let us recall that the assignments for 10 ministries on the introduction of the proposed methods were approved by a decree of the State Committee for Science and Technology. In 10 years such a "crew" was probably also capable of solving more difficult technical problems. The decree of the State Committee for Science and Technology is simply not being fulfilled, so why cite "technical difficulties"?!

The point of view of the All-Union Academy of Agricultural Sciences imeni V.I. Lenin with regard to the "inefficiency" of the new technology differs somewhat from what I. Yefremov reported at one time.

"We support this work, a number of scientific institutes of the academy, which conducted pilot industrial tests of the method in different zones of the country, have become convinced of the usefulness of the new technology," A. Golenishcheva-Kutuzova, scientific secretary of the Council for Problems of the Storage and Processing of Potatoes, Vegetables, and Fruits attached to the Presidium of the All-Union Academy of Agricultural Sciences imeni V.I. Lenin, says. "It is incomprehensible how in the ministry they could have given different explanations...."

Unfortunately, it happened fairly often that way at interdepartmental boundaries: someone did not understand something, did not properly report on something, was too lazy to check, and...an innovation perishes, although more than enough words on the acceleration of scientific and technical progress were said in the departments.

It seems that the establishment of the USSR State Agroindustrial Committee will help to overcome the departmental approach to the solution of problems which are connected with the acceleration of scientific and technical progress in agroindustrial production.

7807
CSO: 1814/211

INVENTION, PATENT WORK AT TAJIK ACADEMY OF SCIENCES

Dushanbe KOMMUNIST TADZHIKISTANA in Russian 7 May 86 p 2

[Article by USSR inventor P. Solozhenkin, chairman of the Section for the Protection of Industrial Property attached to the Tajik SSR Chamber of Commerce and Industry, under the rubric "Science: An Outlet to Practice": "What the Scientist Is to Invent"; first paragraph is KOMMUNIST TADZHIKISTANA introduction]

[Text] At the 27th CPSU Congress it was noted that the country has the right to expect of scientists discoveries and inventions which ensure truly revolutionary changes in the development of equipment and technology. The inventing activity of scientific associates, designers, and engineers--the innovators of production--is one of the most important units of scientific and technical progress. That is precisely why the participation of the scientist in inventing and efficiency work is becoming in our times one of the criteria of the evaluation of his labor.

During the years of the 11th Five-Year Plan 208 inventor's certificates and 2 foreign patents were obtained at the institutions of the republic Academy of Sciences. The invention of the General Genetics of Cotton Department, which was obtained by Candidates of Sciences Yu.I. Pinkhasov, M.I. Dzhafarov, and Kh.M. Dzhumankulov, makes it possible to carry out the chemical removal of the top foliage in cotton, which speeds up its maturation and increases the yield. According to the data of the Tajik SSR Central Statistical Administration, in the past 2 years an economic impact, which exceeds 1 million rubles, has been obtained from the implementation of this invention.

The yield of cotton in case of the use of encapsulated seeds increased by 5 quintals per hectare. The economic impact during 1985 came to 100,000 rubles. This invention--"The Method of Increasing the Germination and Yield of Cotton" of scientists of the Institute of Chemistry imeni V.I. Nikitin and the Institute of Plant Physiology and Biophysics--is being used at the Sovkhoz imeni Konstitutsii SSSR of Yavanskiy Rayon.

The development of the Institute of Seismic Resistant Construction and Seismology, "An Assembly for the Connection of Cross Bars With a Preconcreted Back and the Column of the Frame," is being used in the designing and construction of frame buildings. "A Method of Determining Nickel"--an

invention of the Institute of Chemistry--was implemented at the Noginsk Plant of Fuel Equipment near Moscow.

All these are examples of the successful use of inventor's certificates. Unfortunately, the bulk of the protective documents, which were obtained during the years of the past five-year plan, are being used only in the laboratory practice of scientific institutions and only 15 are being used in various sectors of the national economy (14 percent of the number of inventions). Therefore, at the Academy of Sciences only 21 people were awarded the badge "Inventor of the USSR," which is given to the author for the first introduced invention. All these authors worked at just two institutes--the Institute of Chemistry and the Institute of Astrophysics. There are none of them at the 11 institutes of the natural science type. Of course, all this is obviously too little for the Academy of Sciences.

The work on the identification of new technical solutions and the obtaining for them of protective documents is being performed inadequately. And what is most regrettable, more than 30 percent of the applications of our academy are returned at the stage of preliminary appraisal. Of the number of applications which were examined, for example, in 1982 only 48 percent were recognized as inventions. The Pamir Institute of Biology so far does not have one invention.

In recent years an appreciable increase of inventing activity and the speeding up of the use of inventions have not occurred in the republic. Tajikistan holds last place among the union republics in the number of submitted applications for inventions per 1,000 scientists. This is disturbing. From 1982 to 1984 the number of applications for inventions decreased from 252 to 224.

In 1985 certificates of authorship for 96 inventions were obtained as against 115 in 1984.

At the Academy of Sciences 206 of the 1,533 scientific associates are authors of inventions. But whereas at the Institute of Chemistry every scientific associate is an inventor, at the other scientific institutions the picture is different. At the Physical Technical Institute there are 13 scientific associates per inventor, at the Institute of Seismic Resistant Construction and Seismology--8, while at the Institute of Plant Physiology and Biophysics only 1 of the 15 associates is engaging in invention. At the Institute of Astrophysics, the Institute of Zoology and Parasitology, and the Institute of Mathematics with the computer center there are 7, 10, and 12 scientific associates respectively per inventor. The level of the efficiency of inventing and efficiency work on the basis of the indicators for 1984 for the republic came to only 3.61 percent, while in the Turkmen SSR it came to 14.86 percent and in the Kirghiz SSR--7.48 percent.

During 1981-1984 a little more than half of the assets, which were allocated for the development of invention and efficiency promotion, were used. A large number of minor applications, which are oriented first of all toward the improvement of existing processes, items, and materials, are being drawn up.

Someone said that a signal whistle of a new type will not improve the basic properties of a locomotive. Inventors often aim their efforts precisely at the improvement of the whistle and do not have sufficient stimuli to set to work on a locomotive, since each invention is counted as a unit, regardless of its importance. This contributes to a certain increase of the mass nature, but not the efficiency of invention.

Invented, assimilated quickly, introduced extensively!--such is the motto which scientific and design collectives should follow. Each of these three stages is important, but the practical implementation of innovations requires special attention. Due to the fact that many highly efficient inventions do not find application or do not receive mass dissemination and are used only in individual items, they do not yield the national economy the profit which they can give. It is necessary to take under permanent control the fate of major inventions and to designate in advance the enterprises which will be able to assimilate them in a short time. A well thought out system is needed here.

The need for the further improvement of efficiency promotion and invention and the importance of the development of an effective mechanism of the introduction and use of the results of scientific discoveries and inventions, the development of a system of the selection of innovations, which have a decisive influence on the acceleration of scientific and technical progress, and the improvement of the methods of the planning of work, which ensure the quickest use of these inventions, are noted in party documents.

It is a question, of course, not of introducing all inventions in succession and immediately--this is unthinkable. In each case of the assimilation of an innovation it is necessary to be guided by technical and economic expedience. Therefore, a precise procedure of the assimilation of pioneering inventions, which do not have analogs, should be established. Their implementation should be envisaged in the production plans and projects. Is it possible to encounter such inventions in the plans of new equipment of the republic? I believe that for the present there are few of them.

The Tajik SSR Council of Ministers obliged the ministries and departments of the republic to organize systematic work on the selection and inclusion in the plan of new equipment of scientific and technical developments, which are based on inventions, and to conduct an inventory of highly efficient inventions. Which organization in the republic will monitor these measures?

An alarming situation has formed in patent and license work. The basic goal of patenting--the sale of licenses--so far has not been achieved in the republic. In the past 15 years our institutes, enterprises, and organizations have not turned over to the USSR Chamber of Commerce and Industry a single theme for foreign patenting and have not given recommendations for license analysis.

It is not that we do not have licenses; there are no sales of highly efficient inventions abroad on a commercial basis, thereby we are not fulfilling the plan of the receipt of foreign currency. The trouble is that we are not attempting to perform any work in this direction. There is no selection of what should be patented. On the other hand, we are not very skillfully

advertising the actual achievements. There are difficulties which are connected both with the introduction of patentable inventions and with the lack of major and effective inventions.

For a long time the questions of the organization of patent services in a number of ministries and departments and the establishment in the Science and Technology Department of the republic State Planning Committee of a special group, which deals with the questions of invention, have not been settled and comprehensive programs of the introduction of highly efficient inventions have not been formulated.

When reflecting on invention the problem of the prestige of the engineering labor of the inventor arouses involuntary anxiety. So that the occupation of an engineer and a scientist would again become one of the most attractive, it is necessary to make it such. And this should be worked on together, jointly, by using various methods. Take if only one example.

At present the title of Honored Inventor of the Tajik SSR has been conferred on six innovators and only one associate of the Academy of Sciences, although the bulk of the inventor's certificates have been developed and introduced at the republic Academy of Sciences. Apparently, it is necessary to correct such a situation and it is necessary to create in the republic a more favorable attitude of the community toward inventing activity. The training of engineer-patent experts is an extremely important task, and this is the topic of a special conversation.

Considerable reserves of the increase of the effectiveness of creative technical work exist in the republic. One of the most urgent tasks is to put them to use, as the decisions of the 27th CPSU Congress require.

7807
CSO: 1814/211

USE OF MAGNETOHYDRODYNAMICS IN METALLURGY

Moscow IZVESTIYA in Russian 9 Apr 86 p 6

[Article by V. Khrustov under the rubric "On the Front Line of Science": "Smelting in Terrestrial Weightlessness"]

[Text] Frankly speaking, I expected more. The laboratory of magnetohydrodynamic technology of the Institute of Physics of the Latvian SSR Academy of Sciences, where, as I knew for certain, they had "tamed" weightlessness, seemed to me almost like a module of an orbital station. But, alas, it was not possible to detect any obvious "cosmic" characteristics in the possessions of Doctor of Technical Sciences A. Mikelson and his colleagues. Ordinary equipment for physics research. Is it perhaps the electromagnets?... There were quite a number of them here. They, as it turned out, were also the main "implement of labor" of the Latvian physicists, who had been able in practice to accomplish, it would seem, an impracticable task--to create on earth conditions which make it possible to imitate weightlessness absolutely exactly and, moreover, to derive practical benefit from this.

Before showing me the laboratory and acquainting me with its developments, Corresponding Member of the Latvian SSR Academy of Sciences Ya. Liyelpeter, deputy director of the institute for scientific work, brought me up to date on the work.

"Magnetohydrodynamics," Yan Yanovich related, "is one of the basic directions of the scientific activity of the institute.

"Initially magnetohydrodynamics (MHD) devoted the basic attention to plasma processes on the sun and stars. But very soon the specialists in this field began to deal with entirely terrestrial problems. Liquid metals, which we learned to control by MHD units, are regarded as heat transfer agents in nuclear plants. In particular, fast reactors are cooled by liquid sodium. The use of MHD phenomena in power engineering, metallurgy, and founding is very promising. Unexpected possibilities have been afforded in the obtaining of new materials."

"As far as I know, your collective is devoting particular attention to the development of new materials by means of magnetohydrodynamics. But many

interesting efforts of recent years have been connected with the obtaining of materials in artificial weightlessness...."

"That is so. We began to take an interest quite a long time ago in the problem of obtaining artificial weightlessness by means of magnetohydrodynamics," deputy director and chief of the laboratory A. Mikelson supplemented the account. "And when we learned about the physics experiments in orbit, we decided to give it a try: Is it possible to obtain 'cosmic' materials by means of artificial weightlessness? For if it is possible to do this, such materials will be significantly less expensive than the ones obtained in space.

"We began to examine composites made of materials which do not intermix. There can be a large number of such composites. We examined several versions, including a 'mixture' of aluminum and lead. Under normal conditions they do not intermix, since lead is much heavier than aluminum. If these metals are smelted, they separate, they were as if not vigorously mixed mechanically.

"However, it is very tempting to create such a pseudo-alloy: it is well known that it has good antifriction properties and, hence, may find extensive use first of all in plain bearings.

"The physical essence of the new technology is simple. The furnace is in a magnetic field, rather, in two fields--a magnetic and an electric field, moreover, the intensity of these fields is selected so that the lead and aluminum would 'float' in each other. Having obtained a sufficient fineness, it is possible to cool the mixture gradually, without fearing the sinking of the heavier metal. The new technology provides a significant saving of scarce tin.

"In short, it is possible to speak safely today of the development of a laboratory technology of obtaining a new antifriction material. The results of the research have already been turned over to the USSR Academy of Sciences for the development of a commercial technology.

"Every housewife knows: so that kasha would not get burnt, it is necessary to stir it constantly. In metallurgy there is a complete analogy. With the mere difference that the temperature difference in a furnace comes to 300-400 degrees: at the top it has already been 'burning' a long time, while at the bottom it has not yet warmed up. In short, in order to obtain high-quality metal, it is necessary to stir the melt carefully.

"But how is one to stir a thick mass weighing many tons with a temperature of hundreds, even thousands of decrees? It is clear than an ordinary metal 'spoon' is not suitable here. It turned out that it is possible to mix it splendidly by means of magnetic fields. Moreover, in this case not only does the quality of the metal improve significantly, but the time of the process is also shortened and up to 10-15 percent of the gas is saved.

"Specialists developed a unit for producing the alloy, which includes an induction coil of a 'traveling' magnetic field, which is installed directly

along the side wall of the furnace. The GDR has purchased a license for this system.

"The economic impact from the use of each such unit is several hundred thousand rubles, it pays for itself in a year. However, the introduction of this advanced equipment is proceeding extremely slowly in the country. As a result there is the additional consumption of gas and time and a loss in production quality.

"Incidentally, the unit can not only mix the melt, but also issue the ready metal from the furnace--in other words, it can operate not only as a 'mixer,' but also as a 'ladle.' For this it is sufficient merely to switch, to change the direction of the 'traveling' magnetic field. Such equipment will make it possible to automate this complex metallurgical process. Just one metallurgist-operator will control it.

"Another development of the Latvian physicists--what is called a 'solder oscillator'--is being actively used at enterprises of the radio industry. All the conveyors of the VEF and the Radio Plant imeni A.S. Popov, as well as of many other similar enterprises of the country are equipped with units for the automatic soldering of printed circuits. Without going into technical details, I will say that the woman assembler now does not need to solder the contacts herself. It is sufficient to mount the parts on the board, the automatic machine will do the rest.

"By means of MHD phenomena specialists want to solve another problem of modern metallurgy--to remove phosphorus and sulfur from ore. This is very important, let us say, for the Magnitogorsk Combine.

"By using magnetic fields, it is possible to achieve a high uniformity of glass. Today this is greatly interesting opticians, especially the developers of optical fiber communications systems.

"It should be noted that the staff members of the laboratory are carrying out the development and introduction of all units in cooperation with a large number of laboratories and technological institutes of the country."

While bidding farewell to the people, who had been able to tame gravity and to force a magnetic field to work for itself, I made in my notebook a last note. Just two figures: 100,000 and 17. This means that the collective of the laboratory (17 people) performed last year economic contractual work worth 100,000 rubles.

"It is also possible to perform a larger volume," A. Mikelson noted. "But then time will not be left to work for the future. And without this there is no real science."

7807
CSO: 1814/219

DEVELOPMENT OF VUZ SCIENCE OF ROSTOV OBLAST

Moscow EKONOMICHESKAYA GAZETA in Russian No 16, Apr 86 p 14

[Article by Rector of Novocherkassk Polytechnical Institute Valentin Yefimovich Shushkinov, deputy of the 27th party congress and an honored figure of science and technology of the RSFSR, under the rubric "The Efficiency of Science of the Higher Educational Institution" (Novocherkassk, Rostov Oblast): "For the Development of Ideas. The Institute Needs Design and Technological Complexes"; first two paragraphs are EKONOMICHESKAYA GAZETA introduction; capitalized passages published in boldface]

[Text] More than 35 percent of the scientists, including about half of the doctors of sciences, are concentrated at higher educational institutions, but not more than 10 percent of the scientific research is conducted by them. The question of the more efficient use of the scientific potential of higher educational institutions was raised pointedly in the Policy Report of the CPSU Central Committee to the 27th party congress. In his article Rector of Novocherkassk Polytechnical Institute Valentin Yefimovich Shushkinov, a deputy of the 27th party congress and an honored figure of science and technology of the RSFSR, reflects on how to increase the efficiency of science of higher educational institutions and to increase its contribution to the solution of national economic problems.

All of us welcome the changes which are occurring in the country. But it is not enough just to welcome them. It is necessary for all of us to promote them in a most active manner in order not to allow a gap between word and deed. By discussing the congress documents of enormous political importance, the scientists of Novocherkassk Polytechnical Institute see in a new way their place in the solution of the difficult problems of accelerating scientific and technical progress.

What has already been done, what has to be done? There is the large-scale advanced training of personnel, the 1.5-fold increase of the amount of research and development for the enterprises of Rostov Oblast, and the special-purpose intensive training of engineers in accordance with the orders of sectorial ministries.

The higher educational institution is participating in 10 comprehensive goal programs. It is proposed to establish on the basis of the institute a

republic center for robotics. During the five-year plan at the enterprises of the oblast we will introduce three flexible automated sections, the same number of robotized sections, and a number of new technologies and materials.

The advanced training of personnel is difficult, labor-consuming, but extremely necessary work.

In Rostov Oblast they have actively set to work on the advanced training of personnel from top to bottom--from the economic and technical managers of enterprises to foremen and brigade leaders. Party, soviet, trade union, and Komsomol workers have also not been left aside. At our institute alone 1,200 people a year will undergo training. In accordance with the orders of sectorial ministries we plan to train 15,000 engineers in 42 specialties.

The time has come to take the next step--to establish at the large higher educational institutions of the oblast permanent regular (and not as a voluntary service) centers for the advanced training of personnel and the improvement of their skills.

The times have posed for higher educational institutions a most important task--not only to conduct basic and applied research, but to develop and introduce models of new equipment and technology, materials, automation systems, and robotics. This required of us, the workers of the higher school, a change of the structure of higher educational institutions, their transformation into educational scientific production complexes, and, what is much more difficult, the change of the psychology of scientists.

Alas, not all scientists, I emphasize, even scientists, have realized that the main thing now is not the accomplishment of immediate, minor tasks, but the solution of fundamental, complex, long-range problems. It turned out that some managers of chairs and scientists do not know how or do not wish to work in the new way, want "to live quietly," to give out only quite simple recommendations, and not to engage in serious scientific research and concrete introduction, cannot overcome their "small town" psychology, which formed over the years, and attempt to hold themselves aloof from all reforms. The fact that casual people are found in science attests to the shortcomings in the system of the manning of scientific research institutes and higher educational institutions with these personnel and to the formalism in the conducting of competitions for the filling of vacancies. We have increased drastically the role of the competition commissions and have lent the recertification of personnel a most demanding, fundamental nature.

I will not conceal that in recent times we have had to part with considerable difficulty with many obvious loafers from science. In 2 years alone we got rid of more than 70 such "scientists" who have not occupied their proper place.

The problem of introducing scientific developments in production is no less urgent. So much has already been said about it that it has become the talk of the town. And is it not strange that the state of affairs, even if it has changed a little for the better, did so with much creaking? What, in my opinion, is the essence of the problem?

FIRST. Many scientific institutions, higher educational institutions, and scientists are running idle, they have kept aloof and live for their own interests, and not the interests of production. It is necessary to "stir" them in some way. The question can be put squarely: Is one institute or another needed, if for years they have expected a return from it, but it still does not exist? On the other hand, on the shelves of scientific research institutes and design bureaus and in the laboratories of higher educational institutions truly valuable developments are gathering dust, while production workers do not suspect them: the information relations between them are too weak, they are very timidly going to meet each other.

SECOND. The technical level of production and the skills of personnel at enterprises should be oriented toward the efficient use of science-intensive equipment and technology. Unfortunately, as the results of the checks made by us show, far from all the enterprises of the oblast are ready for the introduction and use of such equipment. For example, at the Novocherkassk Machine Tool Building Plant, the Machine Building Plant imeni Nikolskiy, the Rostov Krasnyy Aksay Production Association, and many other enterprises an acute shortage of adjusters and operators, who are capable of servicing the latest equipment, was found. In this connection the decision was made to establish in the large cities of the oblast special centers for the training of this category of workers.

THIRD. The priority of the volume, and not the quality indicators of the plan makes production unreceptive to scientific and technical innovations. Precisely for this reason the thread which links the two powerful units--science and production--for the present is very thin and unreliable.

The FOURTH and, perhaps, most important thing is the civic position of the scientist and the production worker. If each one at his place senses himself to be a son of the homeland, who ardently wishes it, as they say, health and happiness, the need for the acceleration of the socioeconomic development of the country on the basis of scientific and technical progress will be his personal need and personal concern.

It pains us to realize that some of us have as if become overgrown with moss and have become frozen in our monumentality. We reassure ourselves that if it is very necessary (and is it now really not necessary?), we can and know how, and how we do know how, to do everything in the world. There are actually quite a number of historical examples of this. Now, it seems, precisely that moment has come when for the good of the common cause dedication should be complete.

The scientists of the institute synthesized for the first time in the world high-early-strength high-iron cement. Patents of a number of states were received for this material and technology. A license certificate was drawn up. The economic impact is estimated in the millions of rubles. But the important national economic task proved to be at the meeting point of two sectorial ministries. The USSR Ministry of Ferrous Metallurgy and the USSR Ministry of the Construction Materials Industry do not want to come to an agreement on the joint implementation of the promising scientific and

technical development. Initiative and bold decisions, toward which the party is oriented, are also needed precisely here.

Without waiting for instructions from above, we sought means of improving the mechanism of introduction and possibilities of intensifying scientific labor. Thus, several years ago DESIGN AND TECHNOLOGICAL BUREAUS, WHICH MAKE IT POSSIBLE TO IMPLEMENT AT THE HIGHER EDUCATIONAL INSTITUTION THE ENTIRE CYCLE OF THE ORIGINATION OF ITEMS OF NEW EQUIPMENT, AS THEY SAY, FROM THE IDEA TO THE MACHINE, WERE ESTABLISHED at Rostov State University, the Taganrog Institute of Radio Engineering, and our institute. WITH TIME THEY DEVELOPED INTO POWERFUL EDUCATIONAL SCIENTIFIC PRODUCTION COMPLEXES.

These are not personal service bureaus, but scientific subdivisions which carry out efficiently not only development, but the introduction of innovations in production on the scale of entire sectors of the national economy. HERE THE TIME OF THE DEVELOPMENT AND INTRODUCTION OF NEW EQUIPMENT WAS SHORTENED TO 2-3 YEARS AND EVEN LESS. THERE IS NO PLACE HERE FOR WORK ON MINOR THEMES. IT SEEMS THAT SUCH COMPLEXES SHOULD RECEIVE BOTH LEGAL AND FINANCIAL SUPPORT OF MINISTRIES.

Another means of speeding up the implementation of the developments of scientists is the affording of the opportunity to use the production capacities of plants, especially their experimental shops, for the production of prototypes of new equipment. It is also worth thinking about turning over small enterprises to higher educational institutions.

We are willing, and I am speaking about this not for the first time, to agree to the establishment at the institute of new design bureaus, sectorial laboratories, and temporary collectives of dual subordination for the solution of the vital problems of scientific and technical progress. Unfortunately, no enterprise of Rostov Oblast for the present is displaying initiative and responding to the proposals of our institute.

7807
CSO: 1814/211

PREPLANNING STUDY OF PROBLEMS OF PROGRESS, PRODUCTIVE FORCES

Kishinev SOVETSKAYA MOLDAVIYA in Russian 15 Apr 86 p 2

[Article by Candidate of Economic Sciences Yu. Blokhin, chief of a department of the Scientific Research Institute of Planning of the Moldavian SSR State Planning Committee, under the rubric "Scientific and Technical Progress: Practice and Problems": "With What the Plans Begin"; first paragraph is SOVETSKAYA MOLDAVIYA introduction]

[Text] Preplanning studies of the problems of scientific and technical progress and the territory organization of productive forces are called upon, as is noted in the CPSU Program, "...to find effective and timely solutions of production and socioeconomic problems." Plans begin precisely with these studies. Such important preplanning documents as the Comprehensive Program of Scientific and Technical Progress and the Master Plan of the Distribution of Productive Forces are being drawn up on their basis. Thus, precisely the level and quality of research predetermines the quality of plans.

In our republic many scientific research institutes, higher educational institutions, and design organizations are participating in the conducting of such research. More than 200 academic and sectorial institutes and design organizations of the republic have been involved by the coordinating plan in the scientific research developments in accordance with the Comprehensive Program. An even larger number of coperforming organizations are cooperating in the drafting of the Territorial Plan, in which in addition to republic scientific research institutes and design organizations a number of union scientific research institutes and design organizations have been involved.

The Institute of Economics of the Moldavian SSR Academy of Sciences is the main organization for the study of the problems of scientific and technical progress, while the Scientific Research Institute of Planning of the republic State Planning Committee is in charge of the elaboration of the problems of the regional development and distribution of productive forces.

During the past five-year plan the drafters of the Comprehensive Program substantiated scientifically the basic provisions of the regional economic strategy, identified the trends and key problems of the regional economy, determined the leading directions of scientific and technical progress in the sectors of the regional economy....

The Scientific Research Institute of Planning jointly with coperforming organizations made an analysis of the present state and a comprehensive evaluation of the natural and socioeconomic prerequisites of the further development and distribution of the productive forces of the Moldavian SSR, elaborated measures on nature conservation and the efficient use of the natural resources of the region, and substantiated scientifically the means of solving many other socioeconomic problems.

As a whole the regular work of the republic permanent seminar "The Regional Economy and the Distribution of Productive Forces" attached to the republic board of the economic science society contributed to the successful conducting of research in the area of the problems of scientific and technical progress and the development and distribution of productive forces. Such a seminar, which unites scientists and experienced specialists, helped to examine more thoroughly the problems of the economic and social development of the republic, which are most urgent and require solution within the framework of the Comprehensive Program and the Territorial Plan. In accordance with the results of the seminar specific recommendations for planning and management organs of the republic were formulated.

The gained experience of conducting preplanning research was discussed in detail at the republic applied science conference "The Problems of the Regional Economy and the Distribution of Productive Forces" and was endorsed and recommended for use in the practice of the planning and management of the national economy of the republic.

The Comprehensive Program of Scientific and Technical Progress of the Republic for 1986-2005 and the Plan of the Development and Distribution of the Productive Forces of the Moldavian SSR for the Period to 2000 were the final result of the preplanning research. Both works were examined by the USSR State Planning Committee and the Moldavian SSR State Planning Committee and in the main union organizations, were approved by the Moldavian SSR Council of Ministers, and were used when preparing the Basic Directions of the Economic and Social Development of Moldavia for the 12th Five-Year Plan.

It is possible to judge the importance of preplanning research on the basis of the example of the Territorial Plan, which makes it possible to improve radically the quality of the work on territorial planning, rayon layouts, the drafting of the master plans of the development of cities, and the planning of design and surveying activity. The materials of the plan are being used extensively by city and rayon planning commissions and scientific research and design organizations when drafting comprehensive plans of the economic and social development of the cities and rayons of the republic.

With allowance made for the developed reserve during the current five-year plan the preplanning research on the problems of scientific and technical progress and the distribution of productive forces has to be expanded and raised to a new, higher scientific level. The plan of research in accordance with the Comprehensive Program, in particular, envisages the substantiation of the priority directions of scientific research and the development of the scientific, technical, and general educational potential of the republic, the

directions of scientific and technical progress in the agroindustrial complex and in other sectors of the national economy, the socioeconomic prerequisites and consequences of the introduction of the achievements of science and technology, and so on.

The plan of scientific research work in accordance with the Territorial Plan is also very concentrated. It is envisaged, for example, to give a thorough analysis of the economic and social development of the productive forces during 1976-1990, to substantiate the basic directions and indicators of production specialization and the comprehensive development of the economy, to draw up an intersectorial balance of the production and distribution of products in the national economy of the republic, and so on.

Bearing in mind the scale of the problems, the main organizations have broadened the front of research and have begun to use more extensively the automation of forecasting calculations with the aid of computers.

And all the same the formed organization of research, in our opinion, inadequately satisfies the present requirements. The Comprehensive Program and Territorial Plan are closely interconnected documents. Complete continuity should exist between them. And whereas, for example, when formulating the Comprehensive Program the socioeconomic consequences of scientific and technical progress are analyzed, in the Territorial Plan, with allowance made for this, the basic directions and indicators of the development and distribution of productive forces in the sectors of the regional economy are substantiated.

But for the present, let us state frankly, it is not possible to achieve continuity in the formulation of the Comprehensive Program and the Territorial Plan. The main cause of such a situation is the parallelism and the lack of proper interaction in the work of the main organizations--the Institute of Economics and the Scientific Research Institute of Planning. Their elaborations are not interconnected either methodologically or procedurally, the times of their fulfillment are not coordinated. All this inevitably leads to the excessive expenditure of assets and duplication.

What is the way out of the formed situation? It seems that the experience of the organization of such work in the RSFSR, the Ukraine, and Estonia suggests it. In the Ukrainian SSR, for example, the functions of the main performer and the coordination of the work both on the Comprehensive Program of Scientific and Technical Progress and on the Plan of the Development and Distribution of Productive Forces have been assigned to the Council for the Study of Productive Forces attached to the Ukrainian Academy of Sciences. The problem is being solved in a similar manner in the Estonian SSR. Obviously, it also makes sense to use this experience in our republic.

The need has also arisen to solve without delay another problem: to unite informally the scientific forces of the main organizations, which are engaged in the study of the problems of scientific and technical progress and the development and distribution of productive forces. This is possible either within the framework of the Institute of Economics of the Academy of Sciences or within the framework of the Scientific Research Institute of Planning of

the State Planning Committee. The establishment of an independent regional center for the study of productive forces of dual subordination (to the Academy of Sciences and the Moldavian SSR State Planning Committee) would be the optimum version. Such an organizational solution corresponds to the directives of the 27th CPSU Congress, in the decisions of which, in particular, it is emphasized: "To use extensively new advanced forms of the organization of scientific activity, which make it possible in the shortest possible time to solve important intersectorial scientific and technical problems."

The organization of a regional center will make it possible to conduct preplanning research more purposefully, will eliminate duplication, and will increase the scientific level of analyses. While this, in turn, will have a direct influence on the quality of our plans.

7807
CSO: 1814/216

INCREASE OF RETURN FROM KIRGHIZ ACADEMIC INSTTIUTES

Frunze SOVETSKAYA KIRGIZIYA in Russian 13 Mar 86 p 2

[Article by Academician of the Kirghiz SSR Academy of Sciences V. Zhivoglyadov under the rubric "The Efficiency of Science": "Let Competition Determine. A Scientist Reflects on the Reserves and Stimuli of a High Return"; first paragraph is SOVETSKAYA KIRGIZIYA introduction]

[Text] We are continuing the conversation about the increase of the yield of republic science, which was begun in SOVETSKAYA KIRGIZIYA on 6 February of this year. The need for the radical reorganization of its activity and a resolute turn toward the needs of production was spoken about pointedly at the 27th CPSU Congress. What is preventing academic institutes from responding in deed to the appeal of the party with new significant developments?

At the 18th Kirghiz CP Congress it was justly noted that many academic institutes are still far from the needs of the national economy. Having carefully studied the new version of the CPSU Program and the other materials of the 27th party congress, in which the important role of science is emphasized, you see even more clearly our weak points and the reserves of the increase of the intensification of science.

Let us begin with the fact that the subdivisions of the republic Academy of Sciences have much for a high return, as the times require: interesting developments, experience in the practical application of the results of research in sectors, and skilled personnel. Unfortunately, this scientific potential is being used to far from full effect. Many of our collectives have not drawn the proper conclusions from the pointed criticism which was heard from the highest party platforms.

The theme of the increase of the efficiency of scientific research is quite broad. I will confine myself to its examination from the standpoint of the field of science with which I deal—management theory and information science. As it seems to me, what will be spoken about has a bearing on sectorial science and science of the higher educational institution. For in both significant reserves of intensification also lie in the management of research. I will explain my idea.

In information science two fundamental principles exist: the principle of management with forecasting, which presumes the planning and distribution of resources with allowance made for the anticipated results, and the principle of feedback. The latter can be realized in the form of a system of the moral and material stimulation of scientists.

Let us illustrate this on the basis of the example of our field of science, to which an important place is assigned in the Basic Directions of USSR Economic and Social Development. The task was posed to develop information science and cybernetics, the need for the reform of investment and structural policy and the concentration of resources in the most important directions of scientific and technical progress--electronics, atomic energy, integrated automation...--was emphasized.

It is natural to expect that such urgency should find reflection in the increase of the specific assignments on the most important scientific and technical problems, which, for example, the USSR State Committee for Science and Technology coordinates. But, alas, such changes did not occur in the plans of the republic academy. During the past five-year plan our Institute of Automation fulfilled two assignments in accordance with union comprehensive goal programs, and two assignments in accordance with the all-union scientific and technical program in the field of computer technology are envisaged for the current 5-year period.

The analysis of the introduction of the results of the developments of the institute also revealed a very remarkable picture. In 1985 proposals were introduced in accordance with the plans of departments and enterprises, there were many unplanned, as we say, enterprising introductions. And only one development each was introduced in accordance with the state and the republic national economic plans. The question arises: Are scientists objectively interested in intense and approved plans? Frequently they are not interested. And the main scourge here is leveling.

The financing of institutes and laboratories is weakly dependent or hardly depends on the intensity of the adopted plans. Resources are distributed mainly according to the principle "one earring to each sister." According to established tradition the reduction of the number of staff members of laboratories was also carried out uniformly--practically without allowance made for the category and intensity of the plans. All this has the result that insufficient resources and performers are being allocated for some labor-consuming themes. As a result the work is dragged out, the range of research is unjustifiably narrowed. While the laboratories, which have assumed simpler, minor, or narrow assignments and while having an excessive number of performers, find themselves in an advantageous position. Thus partially "free" people appear. Need it be said that in this case economic and social harm is being done?

In recent times drafts of various comprehensive programs have been drawn up. Not backed by financing, they may remain on paper or be the mechanical combination of the themes and assignments, which the performers plan to fulfill in accordance with their own plans. In the latter case the program has mainly an information function and is not a tool of the management of

research and development. The need for the substantial reform of the established system and the close coordination of the research and financial plans has arisen.

Of course, the approach to basic research and experimental and theoretical operations, on the one hand, and to applied scientific research, on the other, should be different. Whereas in the former case it is possible to speak about the planning of the very process of research and the direction of research, in the latter it should be aimed entirely at the achievement of specific results. Moreover, for society it does make a difference at what cost they were obtained. The competitive selection of themes, for example, on the basis of expert appraisals, could improve planning. In conformity with this material and manpower resources could be allocated.

I hope that all actively working collectives will support me. By the way, such experience exists at the academy, but it is used exclusively in case of the examination of additional assignments on scientific research and the preparation of proposals to the USSR State Committee for Science and Technology for additional financing. (As a rule, their number exceeds by several fold the available resources.) While in ordinary planning such a principle is practically not used. The traditional system with an orientation toward the formed subdivisions, the distribution of resources in proportion to the staffs, and the noncompetitive, as a rule, discussion of assignments today requires breaking. The principle of the comparative evaluation of the anticipated results and the expenditures on their achievement, perhaps, is especially needed in applied scientific and technical developments. For frequently an innovation seems economically efficient only as long as just the expenditures of the introducing enterprise are taken into account, but the expenditures on science are not taken into account.

At the institute we already have positive experience in the planning of the end results in conformity with a system of supply orders of industry. Thus, during the past five-year plan jointly with a number of organizations and production workers a plant technical management automation system of the preparation of the glass charge was developed and put into operation at the Tokmakstroymaterialy Association. The interdepartmental commission, which in December 1985 accepted the system for operation, noted that there are no analogs of it in the country. The ertire amount of expenditures was specified in the 5-year supply order. Organizations of the USSR Ministry of Instrument Making, Automation Equipment, and Control Systems and the USSR Ministry of the Construction Materials Industry--the Kiev Institute of Automation, the State Institute of Glass (Moscow), and the All-Union Scientific Research Institute of Glass (Leningrad)--cooperated with us (the Institute of Automation was the main institute) in accordance with a unified comprehensive plan with the unified financing of all research, planning, and introducing work.

Now about the principle of feedback. The role of moral stimuli in science is very great. Especially as given the system, which existed until last year, only the staff members of sectorial institutes could receive bonuses for high-quality work in accordance with a supply order and for introduction. Such incentives for similar results are not due to our staff members merely because the institute is academic.

It must be said that the average wage of scientists at the republic academy is also appreciably less than on the average for the country. Meanwhile many talented people, enthusiasts, who see the main meaning of life in scientific activity, and skilled and conscientious personnel work here. But it is no secret that there are casual people, lovers of a quiet life. The competitive selection of themes and assignments during planning, the objective evaluation of the results of the performed work, and, finally, informal competition among the performers would become a powerful lever in the increase of the yield of science and the ridding of it of ballast.

It is very important to increase the prestige of the scientist and the priority of scientific activity over all other types of work, in which the staff members of scientific institutions have to engage. While the steps of the party and government on the introduction starting this year of a new system of the remuneration of scientists of academic and sectorial institutes are creating the conditions for effective stimulation for the current results and a differentiated approach to the establishment of the wage. Desire alone is not enough for this. The painstaking systematic work of managers of different levels and the rejection of conservative customary forms are needed.

I have had occasion twice, in 1981 and 1985, to visit colleagues of the Polish Academy of Sciences. After the implementation of the economic reform in the country, there the material levers began to be used more effectively, a system of flexible working time is being introduced, labor discipline and the effectiveness of labor increased.

And about another important reserve of the intensification of scientific research--its automation. Computer support and the establishment of automated workplaces of researchers and automated systems--the means of sharply increasing labor productivity and shortening the time of developments appears that way. Now we are developing at the institute the concept of a computer assistant in case of the solution of research problems, designing, and the making of management decisions.

Joint research with the Polish Academy of Sciences on the development of information expert and interactive automated systems on the basis of microcomputers and personal computers has been started. Here it is appropriate to recall that the introduction of electronics in the national economy and complete automation are two of the five priority directions which were specified by the Comprehensive Program of Scientific and Technical Progress of the CEMA Member Countries to 2000.

7807
CSO: 1814/216

INTERNATIONAL SYMPOSIUM ON MENTAL HEALTH

Moscow MEDITSINSKAYA GAZETA in Russian 21 May 86 p 3

[Article by MEDITSINSKAYA GAZETA special correspondents V. Likholitov and I. Neklyudov under the rubric "International Symposiums": "New Gains of Science of the Brain"; first two paragraphs are MEDITSINSKAYA GAZETA introduction]

[Text] An exchange of opinions of scientists of various countries on the urgent problems of the development of medical science and practice took place at the international symposiums held in Moscow.

The convergence of the physiological biochemical approaches to the problems of the brain with the genetic engineering and biotechnological approaches, which has occurred in recent years, to a significant extent will hasten the further penetration of the secrets of the brain, will lay the foundation for the development and series production of fundamentally new compounds, and will make way for new possibilities in the treatment of mental diseases--such is the opinion of the participants in the international symposium "Neuronal Receptors, Endogenous Ligands, and Biotechnological Approaches," which was organized in Moscow by the USSR Ministry of Health, the USSR Academy of Medical Sciences, the All-Union Scientific Center of Mental Health of the USSR Academy of Medical Sciences, and the Menarini International Foundation.

"Not by chance did Moscow become the site of the holding of the meeting of leading scientists of the world, who work in the field of neuropharmacology and biotechnology. The Soviet Union for a long time now has been playing an important role in fundamental research of the brain and in the identification and artificial synthesis of neuroleptides, which in many respects govern the mental behavior of man," Doctor S. Gorini, president of the Menarini International Foundation, said at the opening of the symposium.

The goal of the Menarini Foundation is to support the most promising research on the solution of urgent biomedical problems. With the participation of the foundation in the past 10 years the results have been summarized and the prospects of the further offensive against oncological and cardiovascular diseases have been outlined. New data on the brain, which were obtained as a result of its study on the molecular level, were also discussed more than once. In the opinion of S. Gorini, the involvement of the methods of biotechnology in the solution of the theoretical and applied problems of

neurobiology is making it possible to use more rapidly the data of basic research in clinical practice. "It is a matter of the pain and sufferings of millions of people. I am glad that nothing could have prevented this meeting of scientists in Moscow," the president of the Menarini International Foundation said in a interview with MEDITSINSKAYA GAZETA correspondents.

In spite of the anti-Soviet campaign, which was launched in the West in connection with the events at the Chernobyl Nuclear Electric Power Plant, the most prominent scientists, who have made the greatest contribution to the solution of the problems discussed at it: E. Costa and G. Sutcliffe (the United States), who are well known in the Soviet Union for their works in the field of neurobiology and genetic engineering, as well as such prominent research scientists as S. Langer and J. Mallet (France), M. Sandler (Great Britain), K.G. Gottfriz and G. Sedvall (Sweden), Doctor H. Mechler (Switzerland), Professor G. Racanii and his colleagues from Italy, and colleagues from the socialist countries--Professor W. Kostowski (Poland), Professor M. Szymoni (Hungary), and many other foreign scientists took part in the symposium.

Academicians N.P. Bekhtereva and P.G. Kostyuk and Academician of the USSR Academy of Medical Sciences A.V. Valdman, the leading Soviet researchers of the brain, delivered reports.

As many statements showed, in the past 10 years truly revolutionary changes have occurred in the views of scientists on the principles of the functioning of the nervous system. New classes of compounds, which govern the activity of nerve cells and the existence of which quite recently was not even suspected, were discovered. Many mental diseases are also connected precisely with disturbances in the functioning of these systems. Without knowing them, the physician was helpless.

During the research at the molecular level it was ascertained that each neuron has sections which as if by nature itself have been adapted in order to link, to alloy with the psychopharmacological agents which are used by psychiatrists in medical practice. The idea arose that during evolution the human brain by way of "self-defense" began itself to produce substances which ensure its normal functioning, and scientists merely used the natural mechanism. Subsequent research completely confirmed the correctness of this hypothesis.

The substances, with which the brain treats itself, received the name of endogenous ligands. Many reports at the symposium were devoted to how the search for these compounds and the study of the mechanism of their action and the performed physiological functions for the purpose of their biosynthesis are proceeding at various laboratories of the world. The goal is tempting: the psychotropic compounds, which have been produced by nature, proved to be less toxic and more effective than plant-produced medicines. But it was ascertained that the body produces endogenous ligands in exactly the amount that is needed for the normal functioning of the brain, that is, in minimal quantities. It is a most difficult problem to extract them from the brain by traditional methods in amounts which are sufficient even for the conducting of scientific research. It was significantly facilitated when specialists in

genetic engineering and biotechnology became involved in the research of neurobiologists.

In our newspaper it has already been reported that the report on the joint work, which was performed by neurobiologists of the All-Union Scientific Center of Mental Health and chemical scientists of the Siberian Department of the USSR Academy of Sciences, was a real sensation of the symposium. As is known, the first neuroleptide was isolated in the laboratory of American scientist E. Costa. Now, it was stated at the symposium, it is becoming obvious that one should speak already not of one, but of an entire family of chemical compounds which are responsible for the maintenance of the normal functioning of the nervous system.

From the report of Moscow medical personnel and chemists of Novosibirsk the symposium participants learned that a gene, which ensures the production of neuroleptides of this series, has been found. Having been placed in the appropriate biological medium, this gene will help to produce neuroleptides, the same endogenous ligands, the effectiveness of which nature ensured over the millions of years of the evolution of the human brain.

"What are the prospects of the actually formed alliance of medical scientists and specialists in the field of genetic engineering and biotechnology?"--we addressed this question to Corresponding Member of the USSR Academy of Medical Sciences M.Ye. Vartanyan, director of the All-Union Scientific Center of Mental Health of the USSR Academy of Medical Sciences.

"We are on the threshold of the development of the most effective medicines against mental diseases no longer under laboratory conditions, but on the scale of plant production. Moreover, extensive prospects are being afforded for the study of the nature of the hereditary dependence of the functions and structure of our brain. Scientists of antiquity were correct when they asserted that it will be most difficult of all for man 'to understand himself and his associates.' According to the most optimistic estimates, today we know the role of only a third of the cells which are involved in the functioning of the brain. As the symposium showed, there is reason to believe that the remaining distance will be covered significantly more rapidly."

A press conference for Soviet and foreign journalists, at which the participants in the meeting at Moscow shared their impressions about the performed work, was held on the last day of the work of the symposium.

E. Costa (the United States): We considered questions which affect the interests of the health of all mankind. Hence, it is also necessary to settle them on not the national, but the world level, as was the case during these unforgettable days. I think that in the end we will be able to understand the nature of aggressiveness, which hinders us so in living in this world. Among the immediate realities I see a biochemical correlation of our negative emotions, the regulation of endocrine functions, and the possibility of directly influencing peripheral organs, and not only through the pituitary body, as we are now doing. I am confident that soon we will also finally understand the nature of alcoholism.

P.G. Kostyuk (USSR): Having penetrated the cells of the nervous system, we obtained the opportunity to effectively influence its activity for the purpose of normalizing disturbed functions. In a few years the data of our basic research will become accessible to pharmacologists and medical geneticists. Much now depends on chemists and geneticists, and they, as the symposium showed, are working very intensively. The held meeting once again showed that only peaceful tasks truly unite scientists of different countries.

S. Gorini (Italy): In the immediate plans of the Menarini International Foundation is the holding of a symposium on the problems of the early development of the brain, which is very important for the decrease of infant mortality, which now so worries scientists and, of course, all people. The unquestionable success of the just completed symposium completely convinced me that the next meeting of the most prominent research scientists in the field of the brain should be held in Moscow. This is the unanimous opinion of the foreign participants in the concluded scientific discussion.

7807
CSO: 1814/219

ANNUAL GENERAL ASSEMBLY OF GEORGIAN SSR ACADEMY OF SCIENCES

Tbilisi ZARYA VOSTOKA in Russian 4 May 86 pp 1, 3

[Article (GRUZINFORM): "The Times Dictate the Tasks. The Annual Assembly of the Academy of Sciences of Georgia"; first paragraph is ZARYA VOSTOKA introduction]

[Text] The improvement of the mechanism of the introduction of new scientific developments, the development of efficient technologies, the strengthening of the experimental design base of academic institutes, the extensive introduction of computer hardware and automation equipment in the activity of scientists, the increase of the role of basic research—thus the participants in the general annual assembly of the Georgian SSR Academy of Sciences defined the priority tasks which face Georgian science in the fulfillment of the decisions of the 27th CPSU Congress and the 27th Georgian CP Congress.

President of the Georgian Academy of Sciences Academician Ye.K. Kharadze delivered the report.

Academician Secretary of the Georgian Academy of Sciences and Academician of the republic Academy of Sciences E.A. Sekhniashvili gave the report on the activity of the academy in 1985.

Academician of the republic Academy of Sciences A.L. Guniya, director of the Institute of Economics and Law; Corresponding Member of the Georgian Academy of Sciences G.G. Gvelesiani, deputy director of the Institute of Metallurgy imeni 50-letiya SSSR; Doctor of Technical Sciences I.Ya. Dzhebashvili, director of the Institute of Machine Mechanics; Academician of the Georgian SSR Academy of Sciences L.D. Melikadze; Chairman of the Georgian SSR State Committee for Science and Technology I.S. Zhordaniya; Academician of the Georgian Academy of Sciences G.A. Sanadze, chief of a problem scientific research laboratory of Tbilisi State University; R.M. Zakandelidze, director of the Special Design Bureau of Scientific Instrument Making of the Georgian Academy of Sciences; Doctor of Historical Sciences B.V. Tekhov, director of the South Osetian Scientific Research Institute; Candidate of Technical Sciences T.Sh. Yamanidze, chairman of the Council of Secretaries of the Primary Party Organizations of the Georgian Academy of Sciences; Corresponding Member of the Georgian SSR Academy of Sciences E.P. Kemertelidze, director of the Institute of Pharmaceutical Chemistry imeni I.G.

Kutateladze, and Doctor of Physical Mathematical Sciences N.N. Vakhannya, director of the Institute of Computational Mathematics imeni N.I. Muskhelishvili, took part in the discussion of the reports.

First Secretary of the Georgian CP Central Committee D.I. Patiashvili delivered a speech at the assembly.

The achievements of scientists of the republic in various fields of sciences were noted in the reports and statements. During the years of the past five-year plan they elaborated more than 1,200 themes of a basic and applied nature. The scientists of the academy are participating in the elaboration of the problems and assignments, which are envisaged by 25 all-union and 27 republic scientific and technical comprehensive goal programs. The results of more than 500 scientific research efforts were introduced in the national economy of the country and republic. The economic impact from them came to 270 million republics, having exceeded by nearly twofold the analogous indicator of the 10th Five-Year Plan.

Partner relations--a new form of the integration of science with production--are being actively developed. Owing to them the results of scientific developments are more rapidly finding application in practice.

During the past year scientists devoted particular attention to the elaboration of the scientific problems which are connected with the designing and construction of the Caucasus Mountain Pass Railroad and the building of the first nuclear electric power plant in the republic. Much was done for the development of new directions of biology and biotechnology. The opening in the system of the Georgian Academy of Sciences of the Institute of Molecular Biology and Biological Physics was an important event. The Interdepartmental Scientific Production Center of Interferon and Biologically Active Substances of the Academy of Sciences and the republic Ministry of Health was established under the Institute of Experimental Morphology. The Center of Metrology and the Collective Use of Measuring Equipment was formed in the system of the academy.

While specifying the tasks of Georgian science during the 12th Five-Year Plan, the participants in the general assembly noted, in particular, that the efforts of scientific collectives of the republic will be focused on the development of basic, fundamental, and applied research which is connected with the thorough and comprehensive study of the natural resources of Georgia for the efficient use in the national economy.

The fields of science, which are connected with the development of machine building, computer technology, instrument making, electrical engineering and electronics, and other areas, which actively influence the development of new generations of machines and equipment, with the development of advanced technologies, and with the increase of labor productivity and the output-capital ratio, will undergo further acceleration. The research in the area of information science and the use of robotics and manipulators will be developed at a priority pace. Particular attention in this case will be devoted to the use of the latter in the sectors which are specific to the republic--tea .pa growing, grape growing, citrus growing, the processing and canning industry,

and so on.

Responsible tasks face the representatives of the social sciences. Their research is necessary for making the optimum decisions in the economy and in the area of the sociopolitical and cultural development of the republic and the country. The acceleration of scientific and technical progress, the improvement of the economic mechanism and the system of the management of the economy, the increase of the level of education and the skills of workers--the efforts of historians, political economists, philosophers, psychologists...will be aimed at the solution of these and other problems.

More attention has to be devoted to developments in the area of ergonomics, industrial design, engineering psychology, economic cybernetics, structural and applied linguistics, mathematical logic, and so on.

The 27th CPSU Congress, it was noted at the general annual assembly of the Academy of Sciences, proclaimed as one of the most important starting points of strategy the acceleration of scientific and technical progress. And this is not a slogan, but a graphic and real expression of the requirements of today.

The task posed for science is difficult, but practicable and at the same time honorable. It is called upon to elaborate practical recommendations on the systematic and balanced development of all the sectors of the national economy and the regulation of several demographic processes which are hard to control.

In particular, the difficulties that have arisen in republic agriculture were noted at the assembly. The further development of agricultural production involves the more active use of the available manpower resources, since they are quite limited.

Therefore, scientific thought should be aimed today at the maximum promotion of the intensification of agricultural production and the acceleration of scientific and technical progress.

The growth rate of industry in the republic comes to 25 percent. This is a quite high indicator. However, today it is already insufficient. In the future the industrial potential of cities and rayons should increase.

To change industry and agriculture over to the path of intensification is an urgent and priority task. However, as a result of the libertarian approach in the past to this question on the past of some party and economic executives the situation in the republic has been complicated in some way. The inefficient distribution of industrial enterprises is occurring. It also happened that way in the capital of the republic, where many industrial enterprises, which it would have been preferable to locate in an outlying area, are concentrated. In the future the situation should be corrected, and here science is called upon to voice its weighty opinion. It is entirely unnatural that in a republic with a population of 5 million 1.2 million people would live in 1 city. And especially in a city with such a unique geographical site as Tbilisi. Under such conditions it is impossible to envisage the creation of all the conditions, which a modern city needs and

which satisfy the requirement of the people, who have to live in the 21st century.

Therefore, precisely scientific and technical progress should determine the strategy of our tomorrow and the tactics of joint actions of scientific and party, soviet and economic organs, which eliminates departmentalism, libertarianism, and chance.

At the 27th CPSU Congress special attention was devoted to the tightening up of discipline in all spheres of our life. Discipline, it was noted at the assembly of the Georgian Academy of Sciences, is a collective concept which implies simultaneously a sense of great responsibility, a love for work, competence, mutual respect, professional pride.... The maximum use of the intellectual potential of science requires precisely great discipline and great consciousness. But, unfortunately, at a number of scientific institutions of the republic so far it has not been possible to achieve this. It is necessary that the campaign for the tightening up of discipline and the increase of competence would become at scientific institutions an object of the universal campaign, and the Academy of Sciences is called upon to head this campaign. For it unites within its ranks the best representatives of Georgian science.

At the assembly close attention was devoted to the question of training young scientists. It was noted that in this direction much still has to be done and first of all at higher educational institutions, where in recent times the demandingness on the training of highly skilled specialists--the main source of the reinforcement of scientists--has decreased somewhat. At the same time as this, it was indicated at the assembly, more should be entrusted to young developing scientists, responsible tasks and positions should be assigned more boldly to them, the observance of Lenin's principles of the succession of generations should be achieved.

At the general assembly of the Academy of Sciences the questions of the material stimulation of the labor of scientists were discussed. It was noted, in particular, that the existing system of the remuneration of the labor of scientists has become obsolete and requires revision and further improvement. It is necessary to find the optimum means which ensure the more active enlistment of scientists in the successful solution of the urgent problems which face the national economy of the republic.

The fact that it is necessary to increase significantly the concern for the improvement of the working and living conditions of scientists and to create a situation, in which, first of all, the talent of a person, his services, decency, honesty, and modesty would be given their due, was also spoken about.

The Georgian Academy of Sciences has to increase the attention to the development of science of the higher educational institution and to the further strengthening of its contact with production. At the same time at the general assembly it was noted that at times these contacts come up against some opposition on the part of individual managers of enterprises and organizations, who do not want to clear the way for the introduction of innovations and for scientific and technical progress as a whole. The

eradication of such an approach to scientific and technical progress is the duty of each party and soviet worker. Along with them the collectives of scientific institutions and first of all the Academy of Sciences should take an active part in this important matter.

At the assembly it was noted with satisfaction that wherever people display a great interest in the introduction of the latest achievements of science and technology, the results are also good. In particular, the example of the Ingurskiy Pulp and Paper Combine (the director is O. Patsatsiya), at which the acceleration of scientific and technical progress enabled the collective to implement important social measures, was cited.

Much has to be done by the institutes of the Academy of Sciences on the expansion of voluntary assistance work at schools. The wish that each institute would take under its patronage a school and jointly with the teaching collective would organize there the exemplary teaching of subjects and that in the future it would be possible to disseminate the valuable experience on the scale of the entire republic, was expressed.

The institutes of the social science type, which are called upon to do much in the area of the communist education of the young generation, need more assistance.

The assembly participants outlined a specific program of actions on the acceleration of scientific and technical progress, the strengthening of the academic detachment of young researchers, the replenishment of the arsenal of scientific ideas and developments, and the further strengthening of the contacts of science and practice.

The annual general assembly of the Georgian Academy of Sciences expressed firm confidence that the scientists and scientific research institutes of the republic would do everything in order to promote as much as possible the successful pursuit of the policy adopted by the party of the acceleration of scientific and technical progress and the successful fulfillment of the historic decisions of the 27th CPSU Congress and the 27th Georgian CP Congress.

N.V. Arzamastsev, a responsible official of the CPSU Central Committee, took part in the work of the annual general assembly of the Georgian SSR Academy of Sciences.

7807
CSO: 1814/218

ROLE OF BASIC SCIENCE IN SCIENTIFIC, TECHNICAL PROGRESS

Yerevan KOMMUNIST in Russian 6 Apr 86 p 3

[Article by Corresponding Member of the Armenian SSR Academy of Sciences S. Matinyan, deputy director of the Yerevan Institute of Physics: "Tomorrow Starts Today. On the Role of Basic Science in the Acceleration of Scientific and Technical Progress"; capitalized passages published in boldface]

[Text] "...To create the conditions for the fruitful activity of scientists. But the country has the right to expect from them discoveries and inventions, which ensure truly revolutionary changes in the development of equipment and technology." (From the Policy Report of the CPSU Central Committee to the 27th CPSU Congress)

THE ACCELERATION OF SCIENTIFIC AND TECHNICAL PROGRESS, that is, the development of advanced equipment and technology, is the basis of our present development.

The outstripping, priority, leading development of basic science—mathematics, astronomy, physics, biology—is becoming the foundation of this. Precisely it acts as the generator of ideas.

I would like to outline briefly the role and place, which basic science holds in our society. The problem is large, therefore, I will limit myself to just a few fragments.

Modern basic science is very expensive: the cost of a detecting unit or accelerator (I will take examples from the field of elementary particle physics or, as it is often called, high energy physics, which is close to me) comes to several hundred million rubles. Astronomy and biology are becoming expensive.

Why, nevertheless, should society support basic science, which does not promise to give immediately, today, specific effective results? The question is legitimate.

Of course, the majority understand the invaluable contribution of basic science to culture, which is connected with our aspiration to create a harmonious unified picture of the world and to establish and perceive the

common laws of nature, which are valid everywhere and anywhere in the universe. Basic knowledge satisfies the spiritual needs of man, which do not reduce only to the perception of art, music, and the beauty of nature. It is necessary to cultivate the perception of the beauty of science. We scientists are in debt to society, for we are inadequately promoting this aspect.

Basic science also has another aspect, which is turned to life, equipment, and technology. And here its EFFICIENCY IS VERY GREAT, MUCH GREATER THAN ANY APPLIED CONCRETE STUDY. For not without reason do they say that there is nothing more practical than a correct theory. It is impossible to imagine any satisfactory level and pace of applied, technological research, which the adequate investment of assets and the development and level of basic research would not precede.

Examples: one of the main achievements of the 20th century--transistors--resulted from the basic study of the structure of the electron zones of semiconductors. The equations of Maxwell and the experiments of Faraday--basic research--resulted in such an influence on our everyday life that it is impossible to imagine it without it. Such was the case with the discovery by Hertz of electromagnetic waves and with the discovery of atomic energy. All this was basic research, moreover, their creators did not even think about the practical use of their discoveries.

Rutherford 5 years before the discovery of nuclear fission--the basis of our present atomic energy--said: "Everyone, who expects that the phenomenon of the transformation of atoms can provide a new source of energy, is engaging in ridiculous dreams." Albert Einstein, whose ideas about radiation are the basis for the operation of lasers, did not suspect the possibility of their development.

If we speak about the practical benefit, which elementary particle physics can yield, one of its possible outcomes--the invention of a new, more efficient method of generating energy--lies in the future. In case of nuclear fission--the basis of atomic energy--4 million times more energy is released (per unit of mass of the fuel) than in case of combustion. However, this is only one five-hundredth of the energy which it is possible "to squeeze" from matter. Now we know the processes, in which it is possible to liberate the entire rest mass in the form of energy. True, it is still a long way to their implementation.

The possible direct advantages from the research, which has been conducted in the past quarter century in elementary particle physics, is not confined to the generation of energy.

I will cite other, more "modern," less traditional examples. Neutrino beams from large accelerators upon passing through the earth in combination with a computer will be able to reconstruct an image of any deep internal region of our planet (neutrino tomography), which creates invaluable opportunities in the prospecting for petroleum, ore, and other minerals.

There are more examples: muons--these penetrating particles which are produced in accelerators and exist in cosmic rays--are used as probes of

materials. Medical nuclear magnetic resonance (YaMR) tomography makes it possible to study the human body and materials with high resolution.

The applied use of accelerator physics is not limited to this. Accelerators serve as a means of the checking of the quality of metal, the production of radioisotopes for medicine, for the sterilization of food, the treatment of tumors, and the disinfection of sewage, which is used after this as a fertilizer. Ion accelerators are one of the means for creating the conditions for a chain thermonuclear reaction, by means of them it is possible to implant ions in semiconductor materials for the production of integrated microcircuits. Synchrotron radiation from electron accelerators like the accelerator of the Yerevan Institute of Physics makes it possible to increase by thousands of fold the density of electric circuits in computers. The use of this radiation in medicine (the tracking of the condition of the circulatory system, into which iodine atoms have first been injected) affords unique possibilities. As a result it is possible to have practically instantaneous information on the finest details of the structure of vessels.

The direct contribution to modern technology from accelerators is great: the obtaining of an ultrahigh vacuum (from 10^{-11}-10^{-13} atmospheres), high power radio signals, and others is indebted to them. The economic impact from this sort of secondary yield comes to many billions of rubles a year.

The apparatus being developed in high energy physics is having a great influence on equipment. The experimental methods in elementary particle physics played an extremely large, it can even be said, a decisive role in the development of computer technology. The unimaginable amount of information, which comes from accelerators, continues to stimulate the development of new methods of data processing and new principles of the architecture of computers, for which the processing of information with a speed of 10 billion operations a second is an ordinary matter.

The phenomenon of superconductivity was used and developed by physicists for the building of large accelerators to such a degree (an accelerator, the total length of the ring of superconducting magnets of which is more than 6 kilometers, has been put into operation in the United States), that now the development of electric power transmission lines practically without losses over long distances is practicable. It is hard to overestimate the economic impact from this.

Finally, there is another type of indirect advantages. This is THE RESULT OF THEORETICAL RESEARCH IN THE BASIC SCIENCES. The methods used in elementary particle theory are being applied for the study of the physical and chemical properties of polymers, the propagation of ocean waves, and the seepage of petroleum in the earth's crust. They had a fruitful influence on the development of solid state physics, which in many respects governs modern scientific and technical progress.

It is interesting to cite the following information. In the European Council for Nuclear Research, which unites the physicists of Western Europe, about 500 industrial firms, which have established there their own affiliates, which

study the needs of science and then introduce and develop at the themselves promising areas, are cooperating with scientists.

Finally, I will note the extremely important role of the basic sciences in the education of creatively thinking scientists.

Scientists, who actively and fruitfully engage in basic science, prove to be the most important personnel when solving many applied problems. In this case they introduce here their own methods and style of work: the highest skill and breadth of approaches, scientific boldness, collectivism, and the absence of conservativism and stagnation.

The specialists, who work in applied fields, usually do not have the broad outlook, without which it is impossible to work on interdisciplinary problems. But they arise very often when working on many applied tasks. These specialists, who have been educated in the spirit of the basic sciences, can do this significantly more efficiently. Unfortunately, many trends in modern higher education, in the training of scientists, and in the organization of modern science are not sufficiently conducive to such synthesizing, comprehensive research.

To what does what was said above testify?

First, the example, which I cited from the experience of the society of physicists of Western Europe (and this is not the only example of this sort), is also of interest for our conditions. IT IS NECESSARY TO FIND NEW FORMS OF THE STRENGTHENING OF THE CONTACT OF SCIENTIFIC PRODUCTION ASSOCIATIONS WITH INSTITUTES OF THE BASIC SCIENCE TYPE, WHICH WAS SPOKEN ABOUT AT THE 27TH CPSU CONGRESS. MOREOVER, THE INITIATIVE HERE SHOULD BELONG TO SCIENTIFIC PRODUCTION ASSOCIATIONS, AND NOT ONLY TO INSTITUTES.

Why, for example, SHOULD SCIENTIFIC PRODUCTION ASSOCIATIONS NOT HAVE THEIR OWN REPRESENTATIVES AT INSTITUTES OF THE CORRESPONDING BASIC SCIENCE TYPE, WHO COULD BE WELL INFORMED ABOUT NEW BASIC DEVELOPMENTS AND COULD MAKE CONTACT WITH THE SPECIFIC NEEDS OF APPLIED OPERATIONS? This form of contact will contribute, using the wording of the CPSU Program, "to the quickest materialization of scientific ideas in the national economy and other areas of human activity." It seems to me that this MEANS OF IMPROVING THE ORGANIZATIONAL AND ECONOMIC FORMS OF THE INTEGRATION OF SCIENCE AND PRODUCTION IS DESERVING OF ATTENTION IN OUR ACTIVITY ON THE ACCELERATION OF SCIENTIFIC AND TECHNICAL PROGRESS AND ITS MANAGEMENT.

The need to have a special authoritative organ (like the State Committee for Science and Technology, as, for example, in Georgia), to which the coordination and management of scientific and technical progress should be assigned, arose in the republic long ago; in particular, it could have effectively solved the problem of establishing direct "partner" relations between scientific and production enterprises--regardless of their departmental affiliation.

Second, IT IS NECESSARY TO CHANGE RADICALLY THE APPROACH TO THE TRAINING OF SPECIALISTS OF THE BASIC SCIENCE TYPE (PHYSICISTS, EVEN THEORETICAL

PHYSICISTS, MATHEMATICIANS, CHEMISTS, BIOPHYSICISTS, AND SO FORTH). THEY, AS WAS SAID ABOVE, WILL FIND FOR THEMSELVES IN CASE OF PROPER VOCATIONAL TRAINING A SPHERE FOR THE APPLICATION OF THEIR KNOWLEDGE AND SKILLS, WHICH WERE ACQUIRED BY THEM IN BASIC SCIENCE. THEY WILL BE ABLE TO WORK IN FIELDS OF APPLIED RESEARCH, WHICH ARE MOST DIVERSE AND INTERESTING FROM THE STANDPOINT OF BOTH THE STATE AND THE SPECIALIST HIMSELF.

7807
CSO: 1814/216

ACHIEVEMENTS OF SCIENCE OF UNION REPUBLICS DETAILED

Moscow NTR: PROBLEMY I RESHENIYA in Russian No 4, 18 Feb-3 Mar 86 pp 4-5

[Article under the rubric "Greeting the 27th CPSU Congress": "The Pulse of Soviet Science. Scientists of the Union Republics for the National Economy of the Country"; last paragraph is NTR: PROBLEMY I RESHENIYA conclusion]

[Text] Azerbaijan

Pipes Made of Fiber

Is it possible to develop a pipe, in which the strength of steel is combined with the flexibility of rubber? And at the same time to replace if only a portion of the expensive and scarce rolled products with less expensive and more accessible synthetic materials? This is all the more important since nearly 20 million tons of steel are consumed annually for the production of pipes! The scientists of the Institute of Mathematics and Mechanics of the Azerbaijan SSR Academy of Sciences were able to make a significant contribution to the solution of this urgent national economic problem.

Basic scientific results, on the basis of which it was possible to develop the theory of the designing and the engineering methods of the analysis of the designs of flexible pipes based on fiber structures, were obtained during the study of the mechanics of composite materials.

A fundamentally new class of designs, the promise of which is confirmed by patents which have been obtained in England, the United States, France, the FRG, and other countries, was developed. Original technological lines for the production of flexible pipes with an inside diameter of up to 75 millimeters were created, connecting assemblies, which ensure airtightness at a working pressure of up to 500 atmospheres, as well as equipment for complex loading during tests of industrial items made of flexible pipes for even higher parameters were developed.

The production of test runs of a range of flexible pipes based on glass cord and strengthened capron cord was organized on the new lines at the Azrezinotekhnika Production Association. With respect to their strength characteristics these pipes do not have analogs, and it can only be regretted their large-series production has not yet been organized.

In the opinion of specialists, the transition from metal pipes to flexible pipes made of composite materials has become imminent on a broad scale. It is now already clear that such replacement can be made, if not in all cases of the use of steel pipes, then, at least, in many of them. In this case the laying of main pipelines, especially under the conditions of the North, in swampy areas, under water, and in shafts and mines, would be greatly simplified and become less expensive.

Armenia

Self-Propagating High-Temperature Synthesis and Titanium

Self-propagating high-temperature synthesis (SVS) is one of the most promising directions of chemical technology. Many chemical reactions proceed, as is known, with the release of energy, which it is possible to use both for the maintenance of the reaction itself and for the heat treatment of the obtained products. The study of such processes, particularly the obtaining of valuable inorganic compounds by combustion, is being carried out by scientists of the Institute of Chemical Physics of the Armenian SSR Academy of Sciences.

The study by Armenian specialists of the kinetics and mechanics of the interaction of elements at high temperatures led to the development of a technology of the obtaining of finely dispersed high-melting compounds of titanium. The new methods have undergone experimental testing, and the first batches of obtained powders have been sent to various organizations.

Now at the pilot section of the institute a method of obtaining synthetic hard tool materials is being developed and the problem of producing throwaway tungsten-free cutting tips for the needs of machine building is being solved jointly with the Armstanok Scientific Production Association.

For the first time the reaction of the interaction of a number of metals with hydrogen by combustion was predicted theoretically, and then was accomplished in practice. The scientific principles of the SVS technologies of binary and more complex hydrogenous and metalliferous systems--hydrides, which are used, for example, in powder metallurgy for the embrittlement of titanium powder, were developed.

A special design and technological bureau with a pilot works was organized for the pilot industrial checking and introduction of the technologies developed at the institute of producing high-melting compounds and hydrides. More than 15 such technologies, which are being turned over to many organizations on an economic contractual basis, have already been developed.

Belorussia

The General-Purpose SAPR-M

One of the advantages of the systems of the automation of designing is the possibility of developing design and technological computer-aid design systems, which ensure the automation of both the designing of parts and the

technological preparation of their production with the generation of control programs which go directly to the NC machine tools and flexible machine systems. Precisely such a system, which is intended for the production of parts and assembly units for general machine building use, the SAPR-M, was developed at the Institute of Technical Cybernetics of the Belorussian SSR Academy of Sciences on the basis of the powerful computer complex of the collective-use computer-aided design system. It is possible to regard the new system as a prototype of the computer-aided design system of the machine building enterprise and at the same time as a testing ground for the development of the technology of computer-aided design and individual technical solutions with respect to systems of such a type.

In the photo [photo not reproduced]: Candidate of Technical Sciences V.I. Makhnach, director of the Interbranch Scientific Engineering Center of the Institute of Technical Cybernetics of the Belorussian SSR Academy of Sciences, junior scientific associate Ya.K. Pogulyayko, and senior technician O.M. Ryzhenkova at the console of the SAPR-M.

Georgia

Farms Without Waste

A number of serious problems regarding the recovery of industrial waste products have arisen in connection with the construction in Georgia of large stock breeding complexes. Under the conditions of the formed economic and ecological situation, when the questions of the most complete use of resources acquired state importance, a biotechnological laboratory was organized 3 years ago on the initiative of the Georgian CP Central Committee at the Chair of Biochemistry of Tbilisi State University. Its basic task is the development of efficient waste-free technologies for hog raising complexes, poultry plants, and enterprises which process meat and dairy products.

As a result, in particular, an integrated system of waste-free technology for hog raising complexes was developed at the laboratory.

The essence of the technology consists in the dehydration of manure by its centrifuging, drying, and division into coarse and fine fractions. The former is used for the production of a feed additive, while the latter is used as a filler in the production of plastics or as a fertilizer. The remaining mass is sent to special filtering sites with zeolite, which simultaneously serve for the cultivation of annual or perennial crops and for the obtaining of turf sod.

Special research was also conducted at poultry plants: a new feed additive, which is obtained from feathers, poultry manure, and fat, was used there. Its tests on 20,000 broilers of the Gamardzhvebskiy Poultry Plant were a success, having yielded the enterprise a net profit of 89,000 rubles.

Kazakhstan

Gallamic Metallurgy

Bauxites and nephelines in addition to the basic component--aluminum--contain many valuable associated components, such as fluorine, vanadium, gallium, and other rare substances. But how are they to be extracted, if the content, for example, of gallium in a solution of alumina, which is intended for the electrolytic obtaining of aluminum, does not exceed tenths of a gram per liter?

This problem was successfully solved at the Institute of Metallurgy and Ore Dressing of the Kazakh SSR Academy of Sciences. An effective technology of extracting metallic gallium from weak industrial solutions by means of electrolytic precipitation with aluminum gallam was developed here. A new branch of the science of metal--gallamic metallurgy--arose. The introduction of the new technology at aluminum combines made it possible in a short time to increase by more than twentyfold in our country the production of gallium, which is so necessary for modern microelectronics and semiconductor technology.

The technology is protected by more than 50 certificates of authorship for inventions and has been patented in 19 countries, including the United States, the FRG, Japan, France, and Sweden.

Effective flow charts of the extraction from now already former waste products of such necessary substances for the national economy as compounds of vanadium, rare earth elements, fluorine, phosphorus, and so forth have also been proposed.

The economic impact from the introduction of these developments at enterprises of the country came to about 10 million rubles. Moreover, more than 1.6 million transfer rubles and $1.2 million were obtained from the sale of the new technologies through licenses and contracts with foreign firms.

Kirghizia

A Harmless Vaccine

Contagious ecthyma, a dangerous skin disease of sheep and goats, has ceased to be a scourge of animal husbandry of the republic.

As a result of the study of the structural morphological and immunobiological characteristics of the local strains of the virus of this disease, which were extracted from naturally ill animals, at the laboratory of virology of the Institute of Biochemistry and Physiology of the Kirghiz SSR Academy of Sciences it was possible to obtain experimentally a vaccine version of the virus, to select the subject of propagation, and for the first time in world practice to develop a highly efficient, completely harmless vaccine. It has been introduced in veterinary practice of the country, its commercial production has been organized.

The use of the compound has changed radically the epizootic situation and has made it possible to rid unfortunate sheep raising farms of the previously widespread disease, which had caused great economic harm to the national economy.

Now more than 3 million doses of the vaccine are produced annually at the institute, completely meeting the needs of sheep raising farms of the republic. The economic impact of the use of this vaccine in Kirghizia alone comes to 3 million rubles a year.

Lithuania

Helicons and the Gelikon

It is customary to believe that an electromagnetic wave does not penetrate conducting bodies and for the most part is reflected off them. It turned out that this is not always so. If a semiconductor is placed in a magnetic field, it will increase substantially its transparency to electromagnetic waves of the metric and microwave band. Moreover, as research showed, the trajectory of the propagation of electromagnetic waves in a semiconductor follows the line of force of the magnetic field. Hence, by means of a magnetic field it is possible to control the trajectory of the propagation of an electromagnetic wave!

The detailed study of the propagation of so-called spiral waves, or helicons, which penetrate magnetized conducting bodies, showed that their speed and amplitude are very sensitive to such parameters of free electrons as the effective mass, collision rate, and energy.

The Gelikon general-purpose fully automated devices, which make it possible to take a topographic picture of the distribution of the magnitudes of the mobility and concentration of electrons on a wafer, has now been developed at the Institute of Semiconductor Physics of the Lithuanian SSR Academy of Sciences. Helicon diagnosis, owing to the absence of metal contacts on the semiconductor crystal, has significant advantages over the generally accepted methods. Gelikon units are already operating at a number of enterprises and scientific institutions as nondestructive gauges of the quality of semiconductor materials.

In the photo [photo not reproduced]: P.Z. Malakauskas, a junior scientific associate of the Laboratory of Solid State Plasma, works at the Gelikon.

Latvia

Mass Diagnosis

Viral hepatitis type B, which in common parlance is called jaundice, has suddenly been thrust throughout the world among the few diseases which do society the most significant harm. The reason is not only migrations and the increase of contacts among people, which is always conducive to the spread of infectious diseases, but also...the increase of medical intervention. Infected blood and a poorly sterilized instrument and syringe for injections

often become the source of infection (not without reason are disposable instruments acquiring greater and greater use).

The only means of solving the problem is the general checking of the entire population "for virus carrying." The carrier of hepatitis B virus cannot be a donor, the necessary precautions should be observed during his medical service, and so forth. It is natural that the method of such mass examination should be simple, inexpensive, and reliable.

Unfortunately, hepatitis B virus is not capable of being propagated artificially, in a laboratory. Therefore, up to now the liver of dead carriers of the virus was the only source of the corresponding diagnostic set. It is clear that such material is not suitable for mass diagnosis.

As in other similar cases, genetic engineering came to the aid. Staff members of the Institute of Organic Synthesis of the Latvian SSR Academy of Sciences were able to cause the bacteria of the colon bacillus E. coli, the usual subject of genetic engineering manipulations, to produce the necessary viral protein. The technology of the production at the experimental plant of the institute of a diagnostic set in accordance with the method, which was developed jointly with the Institute of Microbiology imeni A. Kirkhenshteyn of the Latvian SSR Academy of Sciences, is now being developed.

Moldavia

From the Phytotron to the Biotron

Botanists, especially plant growers, are well acquainted with phytotrons--rooms for the cultivation of plants under artificially regulated conditions. Here it is possible to change the temperature and humidity, the lighting and composition of the atmosphere and to observe how this affects the crops being cultivated.

But what if we go further and equip the phytotrons with special sensors, which continuously measure the characteristics of the development of the plants--the heat and gas exchange, the fluid balance, and so on? And, moreover, using modern means of the transmission and processing of information, feed the information into a computer, where it will be analyzed.

When it was possible to accomplish all this--and very serious efforts of a large collective of scientists and engineers of the Institute of Ecological Genetics of the Moldavian SSR Academy of Sciences and a number of other organizations was required for this--the ordinary phytotron turned into the first biotron in our country.

Unique studies of the mechanisms of the regulation and adaptation of the entire plant organism were launched with its aid. In practice the opportunity to understand the internal adaptive reactions of plants to external stimuli was afforded for the first time. They reduced the lighting, added waters, introduced some pesticides--the computer reports almost instantaneously on the physiological reaction of plants.

Fundamentally new methods of recognizing forms of plants with a high adaptability to diverse stress conditions (cold, flooding, drought, diseases, and others) and, hence, opportunities to choose purposefully in a comparatively short time plants with valuable properties for selection for high and stable productivity appeared.

Tajikistan

Ultrapure Crystals

Crystalline compounds of fluorine with lithium, calcium, magnesium, barium, and other elements have been known for a long time in science and technology mainly as materials for infrared optics. The basic obstacle in case of their use is the need for the deep purification of crystals. The presence of even negligible impurities--especially oxygen--drastically worsens the optical properties of crystals and makes them unsuitable for technical purposes.

Promising methods of the synthesis of inorganic fluorides of high purity and the obtaining on their basis of various mixed composites with preset properties were developed at the Institute of Chemistry imeni V.I. Nikitin of the Tajik SSR Academy of Sciences.

This research was conducted in close contact with the State Institute of Optics imeni S.I. Vavilov, the Institute of Crystallography of the USSR Academy of Sciences, the All-Union Scientific Research Institute of Electric Carbon Items, and other organizations, at which the prototypes of the fluoride crystals of high purity, which were synthesized in Dushanbe, underwent comprehensive tests and recommendations on the improvement of their quality were offered.

At the experimental production section of the academic special design and technological bureau a semi-industrial plant for the obtaining of highly pure materials was established and the development of the technology of their obtaining was carried out. The production of consolidated batches of these materials is being carried out in accordance with contracts and orders of specific enterprises.

The RSFSR

Machine Builders Have a Laser

The Institute of Physics imeni P.N. Lebedev of the USSR Academy of Sciences and the plant-higher technical educational institution of the ZIL Production Association (Moscow) have adopted the socialist obligation to develop for the automation of the technological processes of the machining of parts a laser sensor, which measures the characteristics of the quality of the surface, vibrations, as well as linear and angular displacements. In accordance with this obligation an optical sensor for the contactless monitoring of production processes and the diagnosis of metal-cutting machine tools should be developed by the end of 1986.

Taking into account the urgency of the development, its participants decided to fulfill the obligation ahead of time--by the opening of the 27th CPSU Congress.

As a result a sensor based on a semiconductor laser was developed and its characteristics were studied 6 months ahead of time. The sensitivity of the sensor to linear displacement is better than a micron, the angular sensitivity is not less than 1 second, the classes of the surface roughnesses of the objects being studied are 14-4.

The conducted development is serving as the basis for the creation of a family of specialized sensors, by means of which it is possible to measure the degree of roughness of the machining of a surface, the changes of the angle of its slope, strains and displacements, the contour of the surface, and the range of its mechanical vibrations.

In the photo [photo not reproduced]: senior engineer S.Ye. Solodov at the tests of the new sensor.

Uzbekistan

The Genealogy of Petroleum

Fossil organic matter, which is dispersed in sedimentary rocks, is the basic source of petroleum and gas. The so-called insoluble part, in which, according to the generally accepted opinion, there are no and can be no petroleum and gas hydrocarbons, constitutes an overwhelming portion of this organic matter. Therefore, it was believed that insoluble organic matter does not bear information on the processes of the formation and migration of petroleum and gas.

Contrary to the established views, a group of staff members of the Institute of Geology and the Prospecting of Petroleum and Gas Deposits of the Uzbek SSR Ministry of Geology under the supervision of Academician of the Uzbek SSR Academy of Sciences A.M. Akramkhodzhayev in the micropores and small pores of this "insoluble" organic matter succeeded in detecting significant quantities of petroleum and gas hydrocarbons.

How could they have been preserved, in spite of the treatment of the rock surrounding them with organic and inorganic solvents? It turned out that this is explained by the existence of the special, previously unknown property of the organic matter of sedimentary rocks "to accumulate and retain in their micropores and small pores until specific conditions liquid and gas hydrocarbons--the products of intrinsic transformation at the stages of lithogeny." On 31 October 1985 the described development was registered in precisely such a wording as a scientific discovery by the USSR State Committee for Inventions and Discoveries.

This discovery broadens significantly our notions about the peculiarities of the formation of petroleum and gas. The new knowledge can be used actively when solving the problems which are connected with the prediction and directed search for petroleum deposits. An original method of determining the

potential resources of hydrocarbon raw materials was developed on the basis of the discovery.

Turkmenistan

A Model in the Service of Radio Communications

It is well known that in the atmosphere at an altitude of approximately 100 kilometers under specific conditions a very thin layer, which reflects radio waves and received the name of the sporadic layer, appears. It makes it possible to carry out radio communications at very high frequencies, including the ultrashort-wave band. This phenomenon is well known to amateur radio operators from the reception of television broadcasts over long distances (1,000 kilometers and more) without any retransmissions and without the involvement of the space communications system. On the other hand, when screening the higher areas of the atmosphere, this layer at times disturbs the stability of radio communications through the so-called regular ionospheric layers.

A global analytical model of the sporadic layer, which makes it possible to explain the mechanism of the ultralong-range propagation of radio waves, was developed and produced at the Physical Technical Institute of the Turkmen SSR Academy of Sciences. It is possible by means of it to evaluate quantitatively and to forecast the possibility of such radio communications for any operating frequency of radio waves, route, and time of day and year. A large file of experimental data (about 10 million individual measurements of the world network of ionospheric stations) was generalized while developing the model. As a result it is possible to perform the necessary calculations even on a simple microcalculator. The accuracy and reliability of the model were checked in accordance with the results of numerous experimental measurements and completely satisfy the present requirements of the practice of radio communications.

The model has been turned over for use to the forecasting center of the USSR State Committee for Hydrometeorology and Environmental Control and, moreover, to five scientific research institutes and higher educational institutions, which are dealing with the problems of the propagation of radio waves.

The Ukraine

A Supercomputer Has Been Developed

The development of a wide range of computer aids: supercomputers, general-purpose computers, minicomputers, microcomputers, personal computers, and microprocessors, is envisaged by the Comprehensive Program of Scientific and Technical Progress of the CEMA Member Countries to 2000. On this level supercomputers hold a special place.

In the 1980's there are understood by them computer complexes with a performance of not less than 20 million user operations a second, a length of the computer word of not less than 64 bytes, and a main memory of not less than 1 million computer words. Such computers are needed for the processing

of the enormous amounts of information, which originate in scientific research, during the designing of complex objects, and in the management of modern production.

But the problems, for the solution of which computers with a speed of several tens of billions of operations a second are needed, are already known. It is impossible to obtain such a speed on a computer with a classical sequential organization of computations.

A solution nevertheless exists, and it consists in the "making parallel" of the computations, which it is possible to accomplish by various means. Back in the 1970's the principle of the macropipeline organization of computations was developed at the Institute of Cybernetics imeni V.M. Glushkov of the Ukrainian SSR Academy of Sciences.

On the basis of this principle a prototype of a domestic supercomputer was developed at the institute jointly with other organizations. The computer is a complex which consists of processors of various types--arithmetic, control, and problem-oriented.

The new complex can be successfully applied to the solution of a wide range of problems. The possibility of combining general-purpose, intelligent, and specialized processors guarantees a significant computing power, the efficiency of the use of equipment, and the necessary indicators of reliability. Software, which includes both the methods of the making parallel and programs of the solution of mathematical problems, which take into account the structure and architecture of the complex, was created at the same time as the development of the hardware. As a result a high speed, a significant capacity of the main memory, a nearly linear increase of the performance with the increase of the number of processors, technological feasibility in production and operation, and a comparatively low cost characterize the supercomputer.

Estonia

At the School Computer

The assignment on the development of a school computer was received at the Special Design Bureau of Computer Hardware of the Institute of Cybernetics of the Estonian SSR Academy of Sciences in June of last year. While already in the middle of November the first models of the school computer were demonstrated to specialists. Such a short time is explained not only by the supply of the special design bureau with modern equipment and means of the automation of designing, but also by the great experience of the production here of various microprocessor systems.

The engineers, who undertook the development of the school computer, already had to their account several successful developments in the area of small computer hardware. Among them are the work stations of the Satellit local network, a control computer for a laser, and a microprocessor system for the distribution of fodders in animal husbandry.

A characteristic of the computer for students as compared with previous developments is inexpensiveness, high reliability, technological feasibility in case of mass production, and high demands on the safety and simplicity of use. For children will be working with it!

The computer operates on an eight-bit microprocessor, has a memory of 64 kilobytes and an additional read-only memory of 16 kilobytes. It is provided with good basic programs with a total capacity of 70 kilobytes.

During the development and production of the first examples of the school computer the workers of the special design bureau maintained close contact with the production workers, especially with the enterprises, at which it is proposed to begin the mass production of the new computers.

The first meetings of the school computer with pupils, who received the innovation with great enthusiasm, took place recently.

For much assistance in the preparation of this publication the editorial board thanks the workers of the science and higher educational institutions departments of the Central Committees of the Communist Party of the union republics and the Moscow City Committee of the CPSU, as well as well-known Soviet scientists: Academician of the Uzbek SSR Academy of Sciences A.M. Akramkhodzhayev (Tashkent), Doctor of Biological Sciences N.G. Aleksidze (Tbilisi), Doctor of Physical and Mathematical Sciences G.G. Aliyev (Baku), Doctor of Technical Sciences B.B. Beysembayev (Alma-Ata), Academician of the Moldavian SSR Academy of Sciences A.A. Zhuchenko (Kishinev), Doctor of Chemical Sciences D.D. Ikrami (Dushanbe), Corresponding Member of the Latvian SSR Academy of Sciences E.Ya. Lukevits (Riga), Academician of the Ukrainian SSR Academy of Sciences V.S. Mikhalevich (Kiev), Doctor of Physical Mathematical Sciences V.N. Morozov (Moscow), Academician of the Armenian SSR Academy of Sciences A.B. Nalbandyan (Yerevan), Academician of the Turkmen SSR Academy of Sciences O.G. Ovezgeldyyev (Ashkhabad), Academician of the Lithuanian SSR Academy of Sciences Yu.K. Pozhela (Vilnius), Candidate of Technical Sciences O.I. Semenkov (Minsk), Corresponding Member of the Estonian SSR Academy of Sciences E.Kh. Tyugu (Tallinn), and Corresponding Member of the Kirghiz SSR Academy of Sciences Ts.Ts. Khanduyev (Frunze).

7807
CSO: 1814/214

EVALUATION OF SOCIAL UTILITY OF SCIENTIFIC LABOR

Tbilisi ZARYA VOSTOKA in Russian 6 Apr 86 p 2

[Article by Candidate of Economic Sciences Merab Gvelesiani, chief of the Department of Political Economy of the Institute of Economics and Law of the Georgian SSR Academy of Sciences, under the rubric "Science and Production: Problems of Integration": "Who Is to Evaluate the Labor of Scientists and How?"; first paragraph is ZARYA VOSTOKA introduction]

[Text] The accomplishment of the strategic task of accelerating socioeconomic development is inconceivable without the turn of science toward the needs of practice and without the solution of urgent cardinal problems. This need is, unfortunately, coming up against difficulties, especially when it comes to the social sciences. For it is more difficult to calculate and predict in advance the effectiveness of the recommendations of social scientists; experienced workers, who have become accustomed to the established forms of management, "...are not displaying," as General Secretary of the CPSU Central Committee M.S. Gorbachev emphasized in the Policy Report of the CPSU Central Committee to the 27th party congress, "proper interest in the implementation of the efficient proposals of social scientists."

We were scarcely short of talented scientists, who evaluate soberly the requirements of life and realize the duty of the scientist. However, the difficulties of implementing scientific ideas, and not only in the field of the social sciences, undoubtedly, decrease the effectiveness of theoretical studies of urgent problems of life and therefore, to some degree, also the interest in them. In the Policy Report of the CPSU Central Committee it is emphasized that "our philosophical and economic front and, what is more, social science as a whole are in a state of...a certain remoteness from the requirements of life." Obviously, a mechanism, which ensures the mutual interest of scientists and experienced workers, is needed. Such a mechanism is beginning to form.

In particular, the reform of the system of the stimulation of scientific labor and the exchange of personnel between science and the national economy is beginning. A large differentiation of salaries with their smaller dependence on an academic degree, which according to the idea should also promote the intensification of scientific labor, is envisaged. At the same time a large

number of unresolved issues remain. Among them first of all is the question of the criteria of the evaluation of scientific labor and its results. For in the absence of reliable evaluations and the absence of an economic mechanism, which constantly reveals the impacts, the differentiation of the wage of scientists can also take place subjectively.

The main condition of the system now being introduced is to increase the wage for scientists by releasing negligent personnel. But due to the people who have left not only additional remuneration, but also additional work will fall to someone. To whom? Of course, to those who, as they say, "pull." But such people, as a rule, have more than enough of their own work as it is. It is a different matter if the flexible, general-purpose evaluation mechanism would ensure the constant supplanting of people who for a long time have been "marking time." However, for the present such an evaluation mechanism does not exist, and this circumstance can become a quite strong obstacle to the full use of the merits of the new system. For precisely "the linking of the remuneration of the labor of scientists with their real creative return is," as was noted at the 2d Georgian CP Central Committee Plenum, "also a reliable method of freeing science of casual people."

Systems of evaluations of scientific labor are being proposed, but in them, it seems, for the present the main thing is not present: a common denominator, a reference criterion, as which the universal and eternal social gauge of wealth--socially necessary labor--should serve. For precisely it, according to the teaching of K. Marx, is the substance of wealth. Moreover, it will always remain the substance, "even when exchange value has been eliminated." However, it is a far from simple matter to base oneself on and to proceed from it in practice, especially because the essence of the socially necessary expenditures is interpreted at times in distorted form. At the works, for example, the results are evaluated, in essence, in accordance with the actual expenditures, but it is necessary to evaluate the social necessity of these expenditures, that is, to what extent society needs them and what social benefit they yield.

Thereby the labor substance of wealth is not at all replaced by the indicator of utility, since, when the social utility is normal, precisely the average actual expenditures, which have been made under socially normal conditions, that is, under the conditions of the average skill, efficiency, and intensity of labor, are recognized as socially normal and necessary. The greater, in particular, the labor intensiveness of a product is, the higher, other conditions being equal, its evaluation also should be. Therefore, precisely the average labor intensiveness should become the starting point of the reckoning of the results.

In science it is more difficult to use these criteria, since each specimen of the scientific product, just as the very labor, which creates them, are unique. But the uniqueness and nonrepetitive nature of creative scientific labor and its nonreproducible nature do not at all mean that in it it is impossible to fix typical functions and situations and to determine the average labor intensiveness of operations. For example, it is possible, let us assume, to allot 1,000 hours of working time for the fulfillment of the .pa annual planned scientific research work, which has been evaluated positively.

If the scientist succeeded in performing this work at the proper level in 500 hours or less, this does not change anything, but merely means that the given skilled difficult labor is equal to a larger amount of less skilled, more simple labor. As to the utility of the work, it would be incorrect to attempt to establish it simultaneously, at the same time, for a multistage system of evaluations has formed in science. Among them are the planned, preliminary evaluation of the difficulty and significance of the work; its recognition as completed; the determination of the anticipated and, subsequently, the actual impact from its implementation; the publication and payment of bonuses for works and so on and so forth. The crediting of points (hours) at each stage would be nothing but the additional recognition of the value--social utility--of the expended labor.

Another question is, who is to evaluate scientific labor and its results? This is also the main question--the question of the development of an economic, and not an administrative evaluation and stimulation mechanism. Those who set the tasks for the sector and are really interested in the maximum ultimate or intermediate impact, should play an active role in this process. The dominant role here belongs to society as a whole. However, at the national economic level it is possible and advisable to specify only the general directions of the development of science, the basic proportions between these directions, as well as the planned labor intensiveness (resource intensiveness) of the accomplishment of individual specific, especially important tasks.

When determining the tasks and evaluating the end results the decisive role belongs to scientists themselves. And at the 2d Georgian CP Central Committee Plenum it was emphasized that it is much more easier precisely for scientists to judge the genuine value of one work or another. Here it is important that they would perform this role more actively and that competitiveness and collectivism would be the basis of their labor. It is necessary to support all this with the appropriate economic mechanism.

First of all, it seems, it is necessary to increase the responsibility and to broaden the rights of the supervisor of the theme. For precisely he, just as, say, the theater producer and movie director, is responsible in the end for the work and for its quality. Therefore, he is the person interested in the high-quality fulfillment of the functions by the coperformers of the themes. But the supervisor of the theme at present lacks economic levers of management and lacks even the opportunity to chose codevelopers. Thus, it is necessary to distribute the functions with regard to positions among the staff members who already hold these positions. What happens as a result? First, creative groups of performers are formed usually within individual institutions, contacts outside the institution are difficult, the coordination of the work is of a formal nature. Second, there is no proper material interest in the great efficiency of the end result, the obtaining of which, as a rule, depends on the high-quality work of many scientists and creative groups.

Third, the lack of economic levers complicates the obtaining of the necessary scientific and especially practical information. The gathering of information

is a function to a greater degree not of the supervisor of the theme, but of the coperformer. But the latter in the absence of reliable evaluation guidelines of his work, as a rule, is not very interested in the great efficiency of his labor.

The broadening of the rights of the supervisor of the theme should find expression, first of all, in the choice by him of coperformers and, thus, in the shifting--perhaps, within a strictly limited framework--of the financial resources which have been allocated for the elaboration of the theme. Given the proper responsibility for the assigned job the supervisor will make up a group out of those personnel, who are needed most of all during the elaboration of the specific theme. For otherwise the quality of the result suffers.

It is possible to cite a large number of examples of when the productivity of scientific labor suffers greatly precisely owing to the lack of a specialist of one or another (at times even related) sphere. For example, the problem of retrieving and processing primary factual material is the "Achilles' heel" in the work of political economists, and not only them. Much time is spent on this. Situations arise, when a specialist in information science is quite capable of replacing and freeing three or four skilled scientists from this work, which is not specific to them.

But the main thing, of course, is to unite the flexible creative groups, which are capable of advancing and substantiating a scientific innovation, and to stimulate their labor in conformity with the contribution of each person in this process. In order to keep all the members of the collective of a scientific institution busy to one degree or another with work, it is necessary to divide the functions of the workers into the "minimum" and "maximum." For example, the supplying of the necessary scientific, as well as factual information is within the capability of a specialist of any skill, participation in the elaboration of a uniform conceptual basis of the collective theme should be valued more and stimulated better. It is also possible to assign positions accordingly.

Who is to be the chief and in general how is one to select themes? It is entirely possible, as an experiment, to begin the improvement of the evaluation mechanism, without touching upon the procedure of the planning of the themes and the selection of the supervisors of the themes. But the comprehensive reform of the mechanism would provide a greater return. The bold advancement of scientific ideas, collectivity in case of their discussion, healthy criticism, and the support of fruitful concepts should be encouraged by means of economic levers. It is advisable, in particular, to lend a competitive nature first of all to the process of choosing the themes and the versions of their solution. This is a very important stage, which in many respects predetermines the effectiveness of the subsequent stages of the work.

It seems that precisely such a mechanism, which is based on the principles of competitiveness and collectivism would be aimed at the overcoming of isolation and narrow departmentalism in scientific research, at the broadening of the

contacts among scientists, and at the cooperation of their forces. Such a mechanism can ensure the establishment of the actual social importance of scientific ideas and the development of a system of objective evaluations.

7807
CSO: 1814/216 - END -

END OF FICHE DATE FILMED

27 OCT 1986